THE IRON TRADE REVIEW

VOLUME XXIV. CLEVELAND, O., NOVEMBER 19, 1891. NUMBER 47.

THE IRON TRADE REVIEW.

A JOURNAL OF THE
IRON AND STEEL INDUSTRY, THE MACHINERY TRADE AND KINDRED INTERESTS
IS PUBLISHED EVERY THURSDAY BY
THE IRON TRADE REVIEW CO.,
27, 29 *and* 31 *Vincent Street, Cleveland, Ohio.*

TERMS, (strictly in advance):

One year	$3 00
Six months	1 50
Three months	75

Advertising Rates Furnished on Application.

ENTERED AT THE POST OFFICE AT CLEVELAND, O., AS SECOND CLASS MATTER.

CLEVELAND, O., NOVEMBER 19, 1891.

THE WEEK IN IRON CIRCLES.

General Features.

The business world is approaching the end of the year with every evidence of financial soundness. The annual report of Secretary Rusk on our agricultural wealth estimates the increased value of the crops of the United States at $700,000,000 more than last year's product. This phenomenal addition to the floating wealth of the country is not limited to one single product or locality. It compasses the continent. The best financial authorities hold that, despite recent sporadic cases, the financial situation is sound and satisfactory, the chief factors in this being, first, an abundant current, present and prospective, of loanable capital; second, a sound condition of public and private credit; and finally, a banking system stronger and more efficient than ever before in the history of the United States. With these facts in view, the present lull in the iron market will not be regarded with any degree of alarm by those who have carefully studied the drift of events. Most buyers of iron wish to restrict purchases as much as possible until the annual stock-taking at the end of the year. It is not expected, therefore, that there will be much activity in pig iron until the new year begins. In the meantime, production of pig iron is going on at the phenomenal rate of 9,760,000 tons per annum. There has been some increase of stocks at the furnaces, owing to the lack of cars for shipping. This annual recurring evil in the South is greater than ever this year, owing to the run-down condition of rolling stock of most of the railroad companies. Nearly all Southern furnaces have orders largely in excess of stock on hand and could quickly clean up their yards if transportation was provided. At Louisville, a few sales ranging from car load lots up to 500 tons have been entered at low figures; few furnaces are anxious for orders for the first six months of next year at present market figures. Charcoal irons maintain more strength; inquiry is somewhat better; few sales have been made for delivery during next three or four months, and others contemplated for delivery through the entire of next year. The car-load trade for foundry iron continues at Detroit, but no large business has been visible in that market, with the exception of one deal for a round lot of Southern foundry and forge iron, which went at ruling figures. This is for delivery over the first six months of 1892. The large rate of production, which is known and seen by both buyers and sellers, has induced those furnaces who were inclined to hold back on future delivery orders, to book at least a portion of their output for next year, and hence the offerings are more free, particularly in Southern iron, than they have been heretofore. The Lake Superior charcoal trade for the season is very nearly closed, as this is the last week of navigation upon the lakes, and most of the Eastern buyers depending upon the so-called Summer shipment furnaces, will be stocked to a greater or less extent until Spring. Altogether this season's trade in this particular metal can hardly be said to have been satisfactory, at prices starting in at about $18.50 to $18.75 at Buffalo, in April and May, and closing at the present time at $17.25 to $17.50, cash, at that point. It is now thought that the production will be curtailed to a considerable extent by these same Summer shipment furnaces overhauling their stocks and putting in necessary repairs at this time. The car industry seems to be a busy one; rumors for large orders for general equipment are frequently heard and authenticated, and there are prospects for a much larger business during the Winter months for wheel and malleable iron. Increasing dullness characterizes business in the Chicago district. While car-load orders are numerous, there is but little inquiry for anything in the way of large lots, consumers being now supplied for the balance of the year and well towards Spring of 1892. Prices on coke metal remain unchanged, but some of the Southern companies indicate a disposition to grant small concessions when necessary to secure business. Lake Superior charcoal is also inactive, and a brisk competition exists whenever inquiries are made, even for small lots. The outlook indicates small run of business only, during the balance of year. The conditions, however, are all healthy, and a decided improvement both in demand and values may occur any time after the first of next year. Since the heavy buying of thirty days ago, as was to be expected, but few large orders have been placed at St. Louis, but a good run of orders from carload lots to 100 tons have been reported. Inquiries for steel rails in the West are improving, and bids for some round car orders are being solicited. Present indications at Buffalo are that during the balance of the year there will be an accumulation of stocks, unless a number of furnaces go out of blast. The market is without life; sellers are plentiful, but buyers few. What little buying there is, in the main, calls for future delivery.

The Local Situation.

The high lake rates, instead of abating, seem to grow stronger as the season approaches its close, and eight cents was paid this week for grain from the head of the lake, which is equivalent to three dollars for ore. It goes without saying that no ore was moved at these figures, while the ore shipments from the other ports were insignificant. Indeed, the more conservative vessel owners are not at all anxious to go in for grain, even at the higher rate, in view of the cold which is prevailing in the Lake Superior country, and which may put a stop to navigation at any moment. The future of the ore trade is foreshadowed by the numerous offers made to the producers for ore, to be delivered next year, but as all these offers are based on this year's prices, they find little consideration and no takers. The consumers of ore, in offering the '91 price for '92 ore, say that the state of the market will not permit them to pay any more next year than this, but in reply to this the ore men argue that there is no occasion on the part of the pig iron men to engage their ore eight months ahead of their necessities and in the face of a dull trade, if they had not some ulterior motive. One consumer of Chapin ore, for instance, offers the '91 price for a lot of fifty thousand tons, and altogether the demand will reach well up into half a million tons. There is not the slightest prospect, however, of the sale of a single pound of ore at the prices offered. Among the more important news of the week is the order, by the Pennsylvania Company, of sixty thousand tons of steel rails for '92 delivery, at a figure said to be as good as thirty dollars. The significance of this order will be better understood when it is stated that the Pennsylvania company, cheek by jowl with the leading steel mills in the country, ought to be, and probably is, in a very good position to know when to buy, and at what figure, and that this fact is so well understood by shrewd buyers that an order by the Pennsylvania Company is sure to bring with it a number of others. It need not be particularly stated that the railways throughout the country made no replacements this year, avoiding even some of the most necessary repairs, and their needs at this time are such as to insure, a little later on, a very large amount of work of all kinds, for track work no less than for rolling stock. Pig iron is not moving at all, and business is going on in some quarters in a desultory sort of way, while the larger furnaces are curtailing their production from day to day, cutting off fixed charges wherever possible, and declining to engage their future product at starvation prices now ruling the market. Manufactured iron is not much better off, the demand being weak and the price anything but profitable.

CAR WINDOW OBSERVATION OF THE TINPLATE INDUSTRY.

Mr. Trubshaw, a Welsh tinplate maker, has recently returned to his home from a visit to the United States and has given his impressions of the present status of American tinplate manufacture, in an address before the Llanelly Chamber of Commerce. Mr. Trubshaw is vouched for by the *American Artisan* (anti-American tinplate) as a gentleman having "no political axes to grind," having a "clear vision," and being "an honest investigator bent only upon finding out exactly what efforts have been made to give the tinplate industry a start upon our own shores." Precisely what superior qualifications Mr. Trubshaw possesses for an unbiased opinion, being himself a foreign competitor and presumably an enemy of the American tinplate industry, does not appear; but then the *Artisan*, whose Welsh tinplate advertisements are a standing evidence of its loyalty to Welsh tinplate interests, says Mr. Trubshaw is the best possible authority, and we suppose that is so. The expectant reader's high opinion of Mr. Trubshaw's impartiality, as well as of the comprehensive and accurate character of his information, is scarcely sustained by his utterances, however; for with all his "clearness of vision" he was only able to discover one *bona fide* attempt to make tinplates in this country, namely, in St. Louis. He quite overlooks the fifteen or twenty new works in process of construction, and betrays his ignorance to the extent of referring to the fact (?) that "it is also probable that the experiment will be tried at the Apollo Works, Pittsburgh," when it is well known that P. H. Laufman & Co., Limited, of Apollo, Pa., have for some time been making tin and terne plates on quite an extended scale As an "honest investigator," therefore, Mr. Trubshaw is very far from a success. He neither appears to be honest, nor is he careful enough in his observations or deductions to be entitled to the name of investigator. He should have extended his researches beyond the car window and the beguiling influences of the smoking apartment before he assumed to speak as an unprejudiced and well-informed authority.

ARE THE RAILROADS WAKING UP?

The one depressing influence on the iron and steel market has been the holding back of orders by the railroads—orders which, under natural conditions, should have been given out long ago. Several significant movements have recently taken place, however, which may mean much or little just as they are regarded. The principal event has been the placing of orders by the Pennsylvania Railroad Company for 60,000 to 70,000 tons of steel rails, also for the necessary track supplies and a considerable amount of rolling stock. It is stated that the order has been equally distributed to the Carnegie, Cambria and Pennsylvania Steel Companies, and that the makers' association prices were not shaded. Whether this means the placing of similar orders by other railroads is not apparent. Formerly the Pennsylvania Company set the pattern for the balance, but of late years this custom has not been closely followed. However, the car and locomotive works have lately experienced some encouraging changes in the way of increased orders and large inquiries. Among other items of interest, we note that the Cleveland, Cincinnati, Chi cago & St. Louis Railroad Company is about to ask bids for twenty locomotives; that the Mexican Central is asking bids for three large double engines; that the Central of New Jersey has just given orders for ten heavy freight engines; that the East Tennessee, Virginia & Georgia last week gave an order for 1,000 cars; that the Mobile & Ohio has just ordered 200 gondolas; that the "Big Four" will soon ask for bids on 1,000 freight cars, 25 caboose cars, and 50 passenger cars; and that an order for 61 passenger coaches and 9,550 box and gondola cars is about being completed for the Reading.

This looks like business among the railway equipment men.

THE LONGEST STEEL OR IRON SHAVING.

The time-honored controversy over the question, Who has seen the largest sea serpent? is likely to give place to a query of a different character, viz.: Who has seen the longest iron or steel shaving? In a recent issue *The Iron Trade Review* referred to the fact that Wm. E. Donnelly, a Cleveland machinist, claimed the longest iron shaving, which is 107 feet, whereupon Geo. Berschig, another Cleveland machinist, produced an iron shaving 111 feet long. This brought out the fact that there is on exhibition at Worth's museum, New York, an iron shaving 175 feet. This has heretofore been claimed to be the longest in the world, but Charles Chaffey, still another Cleveland machinist, came forward with the statement that he saw an apprentice in the works of the Brush Electric Company, in Cleveland, turn off an iron shaving 237 feet in length. The honor did not long rest on the brow of the Brush Company's apprentice, for in the St. Louis *Stoves and Hardware Reporter*, of October 15th, appeared an article which showed that the longest steel shaving yet produced, of which there is a record, is one 255 feet long, now on exhibition at the Homestead Steel Works, Pittsburgh, Pa., where are made the great steel bolts to fasten plates to vessels. Another long steel shaving referred to in that article was the one produced, some years ago, at Woolwich Arsenal, England, having been turned off a gun and measuring 171 feet. It was on exhibition at the time as one of the greatest curiosities extant. There is nothing now left but to wait for the next big shaving, or story, as the reader may prefer.

AN OVERPRODUCTION OF PIG IRON.

On July 1st of the present year the estimated production of the blast furnaces of the United States had reached the lowest point in several months. It represented a weekly capacity of 113,483 gross tons, or at the rate of 5,901,116 tons per annum. On June 1st we were producing at the rate of 7,632,664 tons per annum, and on July 1st by another two million leap we had gone up to the nine million ton mark. The increase continued to manifest itself October 1st, and on the first of November we were producing the greatest quantity of pig iron on record, or at the rate of 9,759,620 tons per annum. That a rapid accumulation of stocks is taking place must be evident to the most casual observer, since the pig iron markets have been notoriously weak for several months past. Incomplete figures show that the accumulations of unsold pig iron on the 1st of November footed up 293,245 tons, the largest figures reached this year for the number of stacks reporting.

The two valleys are quite active at the present time. Of the 33 stacks in the Shenango and Mahoning valleys 22 are reported in blast, with a combined weekly capacity of 21,221 gross tons, or nearly 80 per cent. of the full capacity.

THOSE IRON AND STEEL IMPORTS.

Three-fourths of the Government fiscal year expired September 30, 1891, and some surprising results are shown as to our iron and steel imports for the nine months ended on that date. We note a few facts of more especial interest:

From 1,004,479 tons of iron ore received during the nine months' period of 1890, our imports have dropped to 728,719 tons for 1891.

Instead of importing 110,133 tons of pig iron as in 1890, we imported only 42,252 tons in 1891.

Of bar iron we admitted 26,118,473 pounds in 1891 against 42,597,620 pounds in 1890.

Our importations of hoops or ties for bailing purposes, etc., which in 1890 were reported at 32,014,414 pounds, have entirely ceased.

On three important items there has been a material increase this year. For the nine months ending on the 30th day of September, in the years named, our imports of the articles below were (pounds):

	1891.	1890.
Ingots, blooms, slabs, billets and bars of steel in various forms	56,312,276	47,840,327
Sheet, plate and taggers' iron or steel	19,436,037	14,249,428
Tin plates, terne plates and taggers, tin	677,707,351	539,774,518

These three items represent an aggregate value for 1891 of $25,865,861, and for 1890 of $18,675,769, an increase of more than 33 per cent. this year.

The aggregate of imports of all manufactures of iron and steel, however, show only a comparatively small increase, being, for 1890, $33,550,131 in value, and for 1891, $35,412,453.

In a late issue we referred to the Rose Gas Process. Recent practical experiments at Bellefonte, Pa., have shown the following remarkable results:

Pig iron puddling	92,200 lbs.
Gas consumed including heat between turns	743,692 cu. ft.
Gas consumed to lb. pig iron	7.98 " "
Gas to net ton pig	65,960 " "
" " gross "	17,875 " "
Time of heats	1 h. 50 min.
Cost of gas	6.68 c. per 1,000 cu ft.

From the above the *American Manufacturer* deduces the conclusion that to puddle a ton of iron with 17,875 cubic feet of gas beats natural gas, and at 6⅔ cents a thousand cubic feet distances natural gas at Pittsburgh, where 15 cents a thousand is charged.

Further tests of armor plates at Indian Head, near Washington, the past week, emphasized the previous conclusions, viz.: (1) that the high carbon nickel steel is decidedly the best plate, and (2) that the United States is decidedly the best place in which to manufacture the best plate.

CONDITION OF THE BLAST FURNACES OF THE UNITED STATES

November 1, 1891.

[CONDENSED FROM THE AMERICAN MANUFACTURER.]

LOCATION OF FURNACES.	CHARCOAL.					BITUMINOUS OR COKE.				
	Total No. of Stacks.	In Blast.		Out of Bl'st.		Total No. of Stacks.	In Blast.		Out of Bl'st.	
		No.	Week'y capac-ity.	No.	Week'y capac-ity.		No.	Week'y capac-ity.	No.	Week'y capac-ity.
New England	13	5	828	4	315					
New York	8	2	296	6	798	6	3	3,498	3	944
Pennsylvania	14	5	381	9	728	1	0	0	1	600
Upper Susquehanna Valley						25	21	31,497	4	5,335
Pittsburgh						1	1	1,086	0	0
Spiegel						1	1	770	0	0
Allegheny Valley						17	14	12,123	3	1,235
Shenango Valley						3	1	822	2	1,381
Youghiogheny Valley						20	11	8,173	9	3,141
Juniata and Conemaugh Valleys						5	4	4,358	1	1,450
Maryland	8	1	134	7	569	16	12	6,879	4	1,573
Virginia	8	1	47	7	479	1	1	100	0	0
North Carolina						6	2	2,027	4	1,781
West Virginia	2	0	0	2	130	15	10	9,473	5	4,762
Ohio—Mahoning Valley						17	13	10,830	4	2,563
Eastern, Central and Northern						14	2	391	12	3,486
Hocking Valley						13	8	1,679	5	1,185
Hanging Rock	12	8	696	4	335					
Miscellaneous						5	2	639	3	1,060
Kentucky	1	1	98	0	0					
Hanging Rock										
Western Region and Miscellan'ous										
Tennessee	6	4	1,140	2	160	13	10	5,581	3	1,276
Georgia	4	2	513	2	224	2	1	514	1	675
Alabama	14	6	1,499	8	1,826	38	24	16,797	14	8,632
Indiana						2	1	210	1	77
Illinois						19	16	22,553	3	4,364
Spiegel										
Michigan	2	11	4,020	10	3,120					
Wisconsin	5	4	1,962	1	120	4	3	2,855	1	422
Minnesota						1	0	0	1	140
Missouri	2	2	674	0	0	5	1	766	4	3,300
Texas	3	3	664	0	0					
Oregon	1	1	265	0	0					
Colorado						2	0	0	2	708
Utah										
Washington										
Total charcoal and coke	122	60	13,197	62	8,804	252	162	143,621	90	50,091
Total anthracite	157	88	35,925	69	22,582					

SUMMARY.

FUEL.	IN BLAST.					OUT OF BLAST.			
	Number.			Weekly Capacity.		Number.		Weekly Capacity.	
		Month Previous.	Year Previous.		Month Previous.	Year Previous.		Month Previous.	
Charcoal	60	59	68	13 197	12,710	13,726	62	66	8,804	9,922
Anthracite	88	87	108	35,925	34,594	42,670	69	70	22,582	23,435
Bituminous	162	159	166	143,621	134,514	124,059	90	92	50,091	52,812
Total	310	305	342	192,743	180,818	180,455	221	228	81,477	86,169

CAN AUSTRALIA MAKE NICKEL STEEL?

The recent government tests of armor plate, which demonstrate that in the future, nickel steel will be very largely used for such purposes, makes interesting this article from the *Australian Mining Standard:*

An article which recently appeared in a Sydney newspaper calls attention to the enormous nickel deposits existing in Canada, and points out that in consequence of the discovery that a small percentage of nickel mixed with steel is in every way advantageous for shipbuilding, that Canada with her ability to produce 1,000,000 tons of metal per annum, must eventually monopolise the ship-building industry of the world. The statement that all other nickel-producing countries of the world cannot produce sufficient metal to keep one ship-building yard on the Clyde at work must be accepted with a certain amount of caution. The nickel-producing area of Canada is situated in a very cold region, and can only be worked six months in the year. To carry on gigantic ship-building industries successfully, many facilities are required of which nickel is only one—cheap coal, cheap labor, and cheap iron ore are the principal, and a good harbor not frozen-in half the year somewhat of a necessity. That Canada may be able to influence the market price of nickel must be admitted, but before this gigantic industry is entirely abandoned in favor of Canada, Australia may take advantage of her facilities to at least have a say in the question of building her own ships. In Australia we have all the facilities necessary: good harbors, splendidly situated, plenty of coal and iron even cheaper than in England, and we are close to New Caledonia, which, at present, at any rate, is the greatest nickel-producing country in the world. Close to the nickel deposits of New Caledonia are situated some of the finest iron deposits known, which recent assays have proved to be equal, if not better, than the best Swedish or Spanish ores—iron ores that are of just the requisite character for fluxing with Australian ores. No country in the world is to-day in a better position to mine nickel or iron than New Caledonia. With her beautiful harbors she can offer every convenience to shipping, and with her cheap labor both minerals can be put on board ship at the lowest possible figure. And where are there other deposits of this nature within such easy and cheap freighting distance of coalfields like those of Newcastle or Illawarra? It can be demonstrated that iron ores from New Caledonia may be landed at the coal pit's mouth in Australia for a much less figure than iron ores from Sweden or Spain to English ports.

At the present moment New Caledonia could without difficulty produce 100,000 tons of 8 per cent. nickel, but actually the Nickel Co. are shipping 60,000 tons per annum. Calculating on the above at 8 per cent. we have an output of 4,800 tons of nickel, and allowing 5 per cent. of this for mixing with steel for ship-building purposes, we could account for 96.000 tons of shipping. It must be understood that the nickel mines are yet in their infancy, and if ore of a lower grade can be utilized, say, as low as 4 per cent., the output of New Caledonia can be made practically unlimited. The want of coal in New Caledonia will necessitate all or most of her mineral trade coming to the coal fields of Australia, and those who are first in the field and in a position to utilize the iron and nickel deposits of that country, may find the French Government willing to assist them in many ways. At any rate, let us hope that before long Australia will be in the field, and that by combining with her rich coal and iron deposits the inexhaustible resources of New Caledonia, we will be able to obviate the necessity of applying to Canada or England for our iron ships or manufactured iron of any description.

THE ELECTRIC HEADLIGHT.

The use of electric headlights, which, as heretofore noted in these columns, has been gradually extending, has now become quite general in Indiana, nearly all the roads entering Indianapolis now having several in service. The Cleveland, Cincinnati, Chicago & St. Louis is the principal exception.

During the past two years the manufacturers of this light have been at work simplifying and perfecting it, certain imperfections having been developed. It is now claimed that all defects have been cured. A representative of the *Railroad Gazette* made a trip over the Indianapolis, Decatur & Western from Indianapolis to Decatur last week on an engine equipped with the light. Its power is approximately 2,500 candle-power, and it gives the engineman a light which on a straight track will often reveal objects at a mile or more, and for fully one-half a mile all objects of the size of a cow can be distinctly seen in ordinary weather. The greatest distance at which an object was seen was two and a-half miles. This was a window of a station house in which no lamps were burning. When the light was first reflected from the window the appearance was that of a locomotive headlight about a mile away. The window seemed to increase in size until at a distance of about three-quarters of a mile the effect was that of a burning structure. At this distance the outlines of the building could be distinctly seen. These distances were easily computed by counting the telegraph poles, which are 200 feet apart on this road. A water tank was sighted at nearly a mile, appearing much larger than it really was. Bridges with overhead trusses could be seen at half a mile. The highway crossing fences along the line had been freshly whitewashed, and with little effort could be seen a mile.

The most curiously interesting experience was that of running toward the eyes of a rabbit apparently a few hundred feet in advance, but in reality a quarter of a mile. The first impression given was that of a switch light, which on nearer approach looked like a bright piece of metal about a foot in circumference. On this road, where all passenger engines are equipped with the light, the use of switch lights is deemed unnecessary, it being an easy matter to discern the targets at a quarter of a mile. This is not done, however, because the headlight in any way dims the smaller lights; on the contrary, the more powerful electric light seems to intensify the colors, as was demonstrated by running through the yards at Indianapolis and Decatur, and also in approaching railroad crossings where such lights are used.

A Whaleback Passenger Steamship.

Since the Charles W. Wetmore crossed the Atlantic to Liverpool and back again, there has been considerable talk about the construction of a passenger steamer on the same model. The *Scientific American* gives an illustration of a proposed craft of this description. The hull is of the steel barge pattern, almost submerged, and supporting strongly built pier. Two longitudinal bulkheads divide the craft into three main compartments, which are subdivided into twenty-one separate water-tight sections, without doors below the water line. The vessel is 528 feet long, 72 feet wide and 38 feet depth of hold, drawing 28 feet of water. The displacement is reckoned at 14,000 tons and the capacity of the hull is figured at 20,000 tons. The engines designed to drive this craft at a speed of 24 knots per hour are three in number, of 19 500 horsepower, running at 120 revolutions per minute, with propellers of 11.8 feet diameter and 24.2 feet pitch. It is estimated that a vessel built on this plan would give accommodation for 720 first-class passengers.

Identification at a Bank.

The matter of identifying a friend or acquaintance at a bank is generally regarded as a mere business courtesy, and not as placing one's self under any personal obligations. In a recent suit the Supreme Court of Colorado decided that it means more than that, and in its decision it says: "Where a person goes to a bank with another, and identifies him as the payee of commercial paper, on the strength of which the bank pays the money, he assumes the responsibility for the effect of his identification, and he is liable to the bank if the payment was wrong. It matters not that he supposed the person identified was the proper person. When he induces the bank to act upon his representation, he takes upon himself all responsibility, and his good faith does not affect his liability." If this principle is sustained, the matter of identification becomes a more serious thing than it is generally considered.

CHROME steel is made in crucibles, by a re-melting process, from ordinary Norway iron and a given quantity of chromium. The product, which is rolled from ingots in the ordinary commercial round, square and octagon bars, has an insertion of a layer of chrome steel hidden between an inner and outer layer of iron; the combination plates of 5 ply thickness are prepared in the same manner. The completed material is said to be the hardest steel known, and easily resists the drilling, cutting or boring tool of the burglar, hence chrome steel bars and plates are extensively used in making burglar-proof safes and vaults, and in the construction of jails and prisons.

LAKE SUPERIOR MINING NOTES.

The Green Creek Iron & Exploration Co., who were operating on section 29, 47-27, put 80 men at work, October 25, under control of Messrs. Flack and Penglaze. The entire northeast quarter of the section, upon which they either have options or rights which secure them the liberty of taking options, is being minutely looked over by this vast body of men and miners.—[Ishpeming Democrat.

One of the pits at the Webber-Peterson exploration on section 24, 40-17, is entirely bottomed in a grayish looking ore, which many believed "didn't amount to much." Mr. Peterson and Abel Keyes, the latter a fee owner, had faith in the stuff and procured an analysis. The result was most surprising. The ore was found to carry a percentage of 62 60 in metallic iron, and it is thought will come within the Bessemer limit in phosphorus. But little work can be done at this property until machinery is procured.—[Florence Mining News.

At the Buckeye's new find on the hill on the west half of section 33, 40 18, this county, the shaft is down 33 feet, the last 16 feet being in good, clean ore. Eight test pits on the same formation are all bottomed in ore at a depth of from seven to 16 feet. Specimens of ore taken from various parts of the property were analyzed this week, and gave an average of 58.25 per cent. in metallic iron. The company is now engaged in widening the main shaft, preparatory to sinking to a depth of 100 feet and crosscutting across the formation. The intention is to thoroughly develop this portion of the property and then resume operations at the old workings at the foot of the hill. The Buckeye adjoins the Commonwealth property on the west, only one 40 separating the two properties.—[Florence Mining News.

Recent developments at what is known as the "Blaine" property, in the vicinity of Carp river, have been such as to warrant a sudden rise in the price of stock and the means whereby considerable stock has been disposed of.—[Negaunee Iron Herald.

At the East New York a particular rich section of vein has been encountered in the lower level of this mine, we are informed, the ore running about 66 per cent. metallic iron and very low in phosphorus. The mine has shipped about 52,000 tons this season, 42,000 of which was of Bessemer grade.—[Iron Ore.

At the new workings of the Pittsburgh & Lake Angeline Iron Co., located near the eastern end of the lake, they are still developing the deposit, and with good success. They would be ready to do something in the way of ore hoisting were the new boiler here and in place, but it has not yet arrived.—[Iron Ore.

At the Elba, after working two years, sinking and drifting has been discontinued, and diamond drilling may again be resorted to. The property is located in the city of Negaunee. Something like $30,000 has been expended in exploration. Lean hematite was encountered at many points, but a workable deposit is yet to be met with.—[Iron Ore.

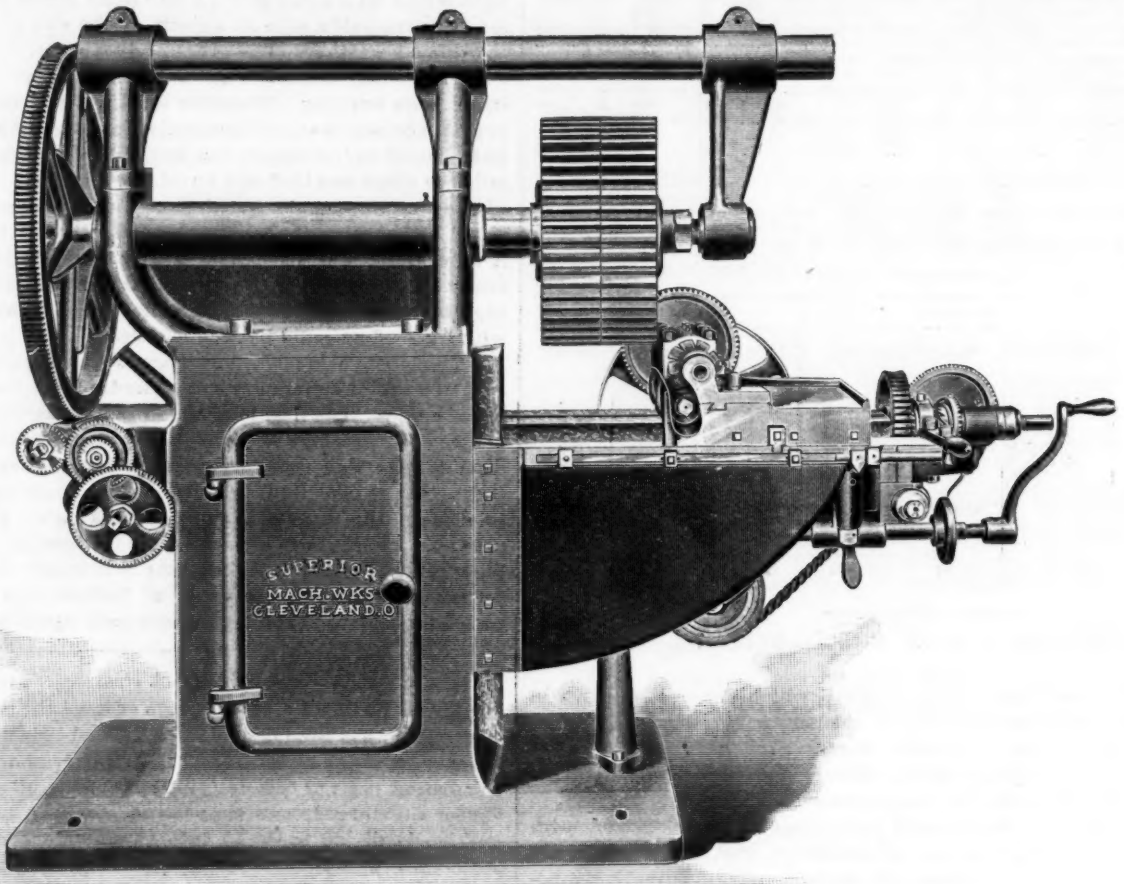
At the Blue the sinking of the shaft is going forward at rapid pace. The South Shore and the Northwestern railroad companies are now laying tracks to the shaft. Machinery from the Detroit mine is being removed to the Blue engine house, and as soon as the ore deposit is reached everything will be in readiness to take care of the product.—[Iron Ore.

The Lake Superior Iron Co. started a second shaft at their property adjoining the Winthrop mine, this week, this being located some distance to the south of the one commenced several weeks ago.—[Iron Ore.

The Cleveland Iron Mining Co. has pushed its standpipe down 65 feet, where they are exploring in the northern part of town, and have found nothing but boulders for the last 25 feet. The shaft being sunk a little distance to the North of this is down 62 feet, and has not yet found ledge.—[Iron Ore.

Arrangements have been perfected between the Fitch Co. and the owners of the fee, the Iron Cliffs Co., whereby the latter are to continue work at the property. They will take possession until the first of the coming June, will do considerable in the way of exploring by sinking and drifting, and will also probably operate a diamond drill from surface.—[Iron Ore.

Time and developments at the Minnesota mine, serve only to demonstrate what an immense deposit of ore is included in that property. Within the past few days a body of ore has been uncovered between the Montana and No. 6, which contains at least 100,000 tons of ore and possibly twice that much. The ledge is from two to eight feet below the surface and was located in the course of work incidental to putting in a raise for the lowering of rock and dirt into No 6. The ore has already been uncovered a distance north and south of nearly seventy feet, and the same formation has now been located on the north side of No. 6 pit, thereby giving it a continuation of over 200 feet. A drift is now being driven toward the Montana shaft and the ore from this new find wil be thrown into the new raise and then trammed through this drift to the Montana shaft, where it will be brought to surface. A portion may also be taken out through No. 6. The distance of the deposit east and west has not yet been determined. The location of this ore body so near the surface, surrounded as it is by shafts on both sides, is quite a surprise to many, although we would not pretend to say that it was to the Minnesota managment. Within the past few days another discovery has been made with the diamond drill that is most significant, as it portends the location of other lenses of ore south of the general trend of the Minnesota vein. At the 200-foot level, the drill boring southward from No. 6 has strack a thirty-two foot lens of the usual high grade ore. At No. 1 shaft, the outlook, or rather the mine itself, is better than ever before. At the fourth level drifts have been driven east and west a distance of several hundred feet and 200 tons are daily taken from this and the fifth levels. The vein here has a width of forty-five feet and the product ranks with the higher grades produced by the Minnesota.—[Vermilion Iron Journal.



NEW FULL AUTOMATIC GEAR CUTTING MACHINE.—(See page 5.)

Steel Ship-Building in Canada.

Captain J. B. Fairgrieve has about completed arrangements for the construction of a steel steamship, at Hamilton, Ont, this Winter. The vessel is destined for the general freight traffic between Montreal and Lake Superior points. She will be 180 feet long, the full capacity of the St. Lawrence canals, and will be built of Scotch steel. The cost of the boat will be about $60,000. She will be 1,200 tons burden, and will be finished by May 1, 1892. The "Comox," the first of the steel steamers built at Vancouver, B. C., by the Union Steamship Co., was launched last week. This is the first steel vessel built North of San Francisco.

VISIT friends, taking the line of the Nickel Plate Thanksgiving Day. One fare for round trip, November 25th and 26th.

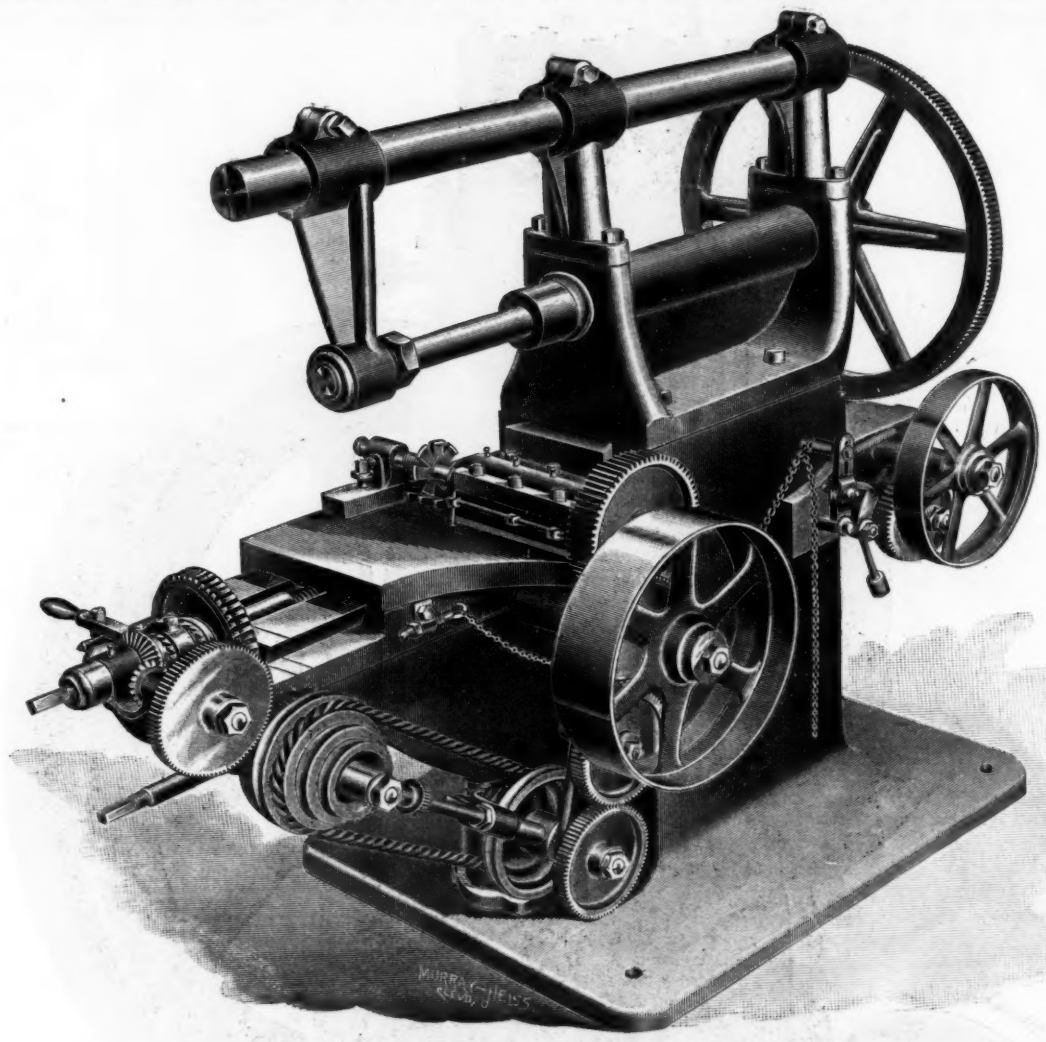
THANKSGIVING rates via Nickel Plate, November 25th and 26th. One fare for round trip.

NEW FULL AUTOMATIC GEAR CUTTING MACHINE.

This machine, whose main features are great strength, simplicity of construction, and capacity for turning out work, is not equaled by a machine of greater range—whether it be 50 or 60 in., and will readily carry a two-pitch cutter to its limits. The mechanism of feed and return of carriage is so simple of construction that it cannot fail to operate, or cannot get out of order. The mechanism for indexing also, which can be readily understood from the cut, consists of a locking dog which engages with notch in disc, and a latch which is hinged to lever engaging with the locking dog. Before the carriage reaches out end of stroke, the chain, by pulling on lever, releases locking dog from the disc, the lever being pulled back far enough to release locking dog by the projection in latch striking pin in front of it—the locking dog is again ready to engage with notch in disc. The head stock being 25 inches long affords a substantial support for the main spindle, which projects over slide, and is supported at outer end also on this portion which is two in. diameter the work is held. The cutter spindle is 1¾" diameter and has a bearing 10½" long—an indicator on front of bearing locates cutter. The knee on which the central carriage slides is a heavy casting, weighing 400 lbs., and is rigidly gibed to column and supported by vertical screw, which serves to raise and lower the same. The machine is driven by a four-inch belt, the tighten or take-up for belt being on countershaft overhead is a feature that users of gear cutters can fully appreciate. The following table of change gears, as shown herewith, is in keeping with the rest of the machine:

Cut.	Worm Gear.	Stud.	Disc.	Cut.	Worm Gear.	Stud.	Disc.	Cut.	Worm Gear.	Stud.	Disc.
12	24	108/80	120	29	29	72/56	108	46	46	72/56	108
13	26	"	"	30	30	"	"	47	47	"	"
14	28	"	"	31	31	"	"	48	48	"	"
15	30	"	"	32	32	"	"	49	49	"	"
16	32	"	"	33	33	"	"	50	50	"	"
17	34	"	"	34	34	"	"	51	51	"	"
18	36	"	"	35	35	"	"	52	52	"	"
19	38	"	"	36	36	"	"	53	53	"	"
20	40	"	"	37	37	"	"	54	54	"	"
21	42	"	"	38	38	"	"	55	55	"	"
22	44	"	"	39	39	"	"	56	56	"	"
23	46	"	"	40	40	"	"	57	57	"	"
24	24	72/56	108	41	41	"	"	58	58	"	"
25	25	"	"	42	42	"	"	59	59	"	"
26	26	"	"	43	43	"	"	60	60	"	"
27	27	"	"	44	44	"	"	61	61	"	"
28	28	"	"	45	45	"	"	...	...	...	...

Pinions of 12 to 23 teeth are cut with a change gear having twice the number of teeth required to be cut. Gears of 24 to 61 teeth are cut with a change gear having exact number of teeth required to be cut—a system that will save many costly errors. Weight of machine 4,000. Speed of counter 130. Manufactured by the Superior Machine Works, 106 Canal St., Cleveland, O.



NEW FULL AUTOMATIC GEAR CUTTING MACHINE.

Fire-Proof Flooring.

A building inspector, in Hamburg, recently made a series of experiments to test the comparative fire-resisting qualities of different sorts of flooring. He constructed 11 pieces of flooring, all of fir, unplaned. The floor was double in every case, save the first, and the boards ranged from 1½ to 2½ inches in thickness. The first floor, of single boards, burned through in 30 minutes. Then, for the second and third experiments, the floor was doubled, the joints running the same way; two layers of asbestos paper were placed between the second piece of floor, and "superator" (probably thick asbestos felt) between sample three. The second burned through in one hour and four minutes, and the third in one hour and thirteen minutes. The fourth and fifth samples were double floors, which resisted well. The sixth floor was like the fifth, save that the joints crossed each other at right angles. This floor required an hour and twenty-two minutes to burn through, the crossing of the joints being more effective than the asbestos paper or superator. The seventh, eighth and ninth pieces had asbestos or superator between the boards, and the resistance in each case was prolonged somewhat. Ordinary roofing felt was placed between the boards in the tenth piece, and it resisted one hour and twelve minutes. In the last piece, the upper floor was of matched inch boards, and the under of planks 2½ inches thick, with square joints running at right angles with those of the upper flooring. Nothing was put between the floors, but the resistance was two hours and twenty-two minutes.

Unique Railway Project.

A company has been formed in Hamburg for putting into practical shape the latest passenger transport project, the construction of pneumatic railways. A line on the new principle is, in the first instance, to be built between Hamburg and Buchen, and the distance of 24 kilometers (15 miles) is to be performed in eleven minutes. It has not yet been decided, we are informed, whether an aerial or a subterranean system will be adopted; but it is thought that the last-named method will be selected; although more expensive, it is considered safer. The carrier intended for the conveyance of the public is to be of cylindrical form, one meter (39⅜ inches) in diameter and two meters in length. This is to enclose three smaller cylinders, of the size of a human being, in which the passenger is to travel. Each cylinder is to contain an apparatus, filled with compressed fresh air, which is to begin to operate as soon as the train is put in motion. When the travelers have taken their places, the cylinder is to be closed and installed in the pneumatic tube, which is to be constructed on the Mannesmann system, and which is to carefully regulate the velocity of the train. The maximum speed is to be attained within 30 seconds from the moment of departure, and a gentle, sliding motion is expected to be experienced by the passenger, whose small compartment is to be illuminated by an electric glow lamp. Travelers are to be allowed a limited amount of luggage. But smoking is to be strictly prohibited.

Make Vulcan Snort.

A feat of steel casting that eclipses the best performance of American works was recently accomplished at the River Don Works of Vickers, Sons & Co., in Sheffield, England. The casting was an ingot, weighing 96 tons, and it is believed to be the largest casting of steel ever made. The casting is to be used for one of the parts of a forging press, which is also said to be the largest in the world.

THANKSGIVING rates on the Nickel Plate.

THE SINTZ GAS AND GASOLINE ENGINES.

The Sintz gasoline engine, herewith shown, is operated as follows: A small force pump for gasoline is attached to base of engine, and is operated by a cam on the center shaft. The supply tank is placed on the outside of building, and a small pipe (¼") leads to suction side of pump. A very small base discharge pipe leads to, and discharges into the air pipe near the inlet or air valve of the engine. The throw of this pump is controlled by the governor, viz.: when the engine is working maximum power, the gasoline pump begins its down or discharge stroke. When main or power piston has made one-fourth of its down charging stroke, and finishes the stroke when power piston has made seven-eighths of its charging stroke, causing all the gasoline to pass into the combustion chamber. The return stroke compresses the charge and it is exploded, at a point (determined by the indicator) just before crank reaches the upper centre so as to give full pressure when crank is on the centre. When engine is running light, the charge is made to suit the work being done. Then if it requires one-fourth of a charge, the governor allows the power piston to descend and take air for five-eighths of the stroke, when gasoline pump begins its stroke, but finishes at the same point as when giving a full charge, thus making its action the same as that of the automatic steam engine. The charge is so placed in relation to the exploder, as to always insure being ignited. This engine is strictly of the "automatic cut-off" type, and the economy and regularity is as great over all gas engines of "full charge or no charge," as the automatic is over the throttling engine. Another very important feature of the Sintz is it never requires being cleaned in the inside (and a number of them never get cleaned outside). These engines have been running on the Northwestern Ohio natural gas for the past 18 months, without the least trouble and with no cleaning inside. This gas is full of sulphur and will destroy any other engine on the market. The automatic action of the engine is the same when using any kind of gas as when using gasoline. Referring to Fig. 2, which, as stated above, shows the engine as arranged for gasoline, the fuel is in the tank T, which is outside the building in any convenient situation. A pipe leads from this tank to the suction of the small pump S, which is driven from the auxiliary shaft above the crank-shaft, and at one-half its speed. The stroke of this pump is varied by the action of the governor, a full load on the engine causing the stroke of the pump to begin when the main piston has descended through about one-fourth of its charging stroke, and terminate when the piston has made about seven-eighths of its stroke. When running light, the stroke of the pump terminates at the same point as before, but begins later, in proportion to the work to be done, thus making it an automatic variable cut-off engine, and securing comparatively close regulation with good economy. The gasoline is delivered through the pipe L, from which it passes to the air pipe, and is mixed with the proper proportion of air before going to the combustion chamber. From the same auxiliary shaft the valve rod J is moved, and also the rod which controls the igniter B, the gas being ignited by a spark from the battery seen on the floor at the right. The cylinder is water, jacketed by a pipe which enters the jacket at one side just below L, the return being through the pipe M. These engines are working with coal gas, water gas, and natural gas from Northwestern Ohio, Indiana, New York and California, also running with petroleum fuel gas that is 97 per cent pure air. Manufactured by Clark Sintz, Springfield, O.

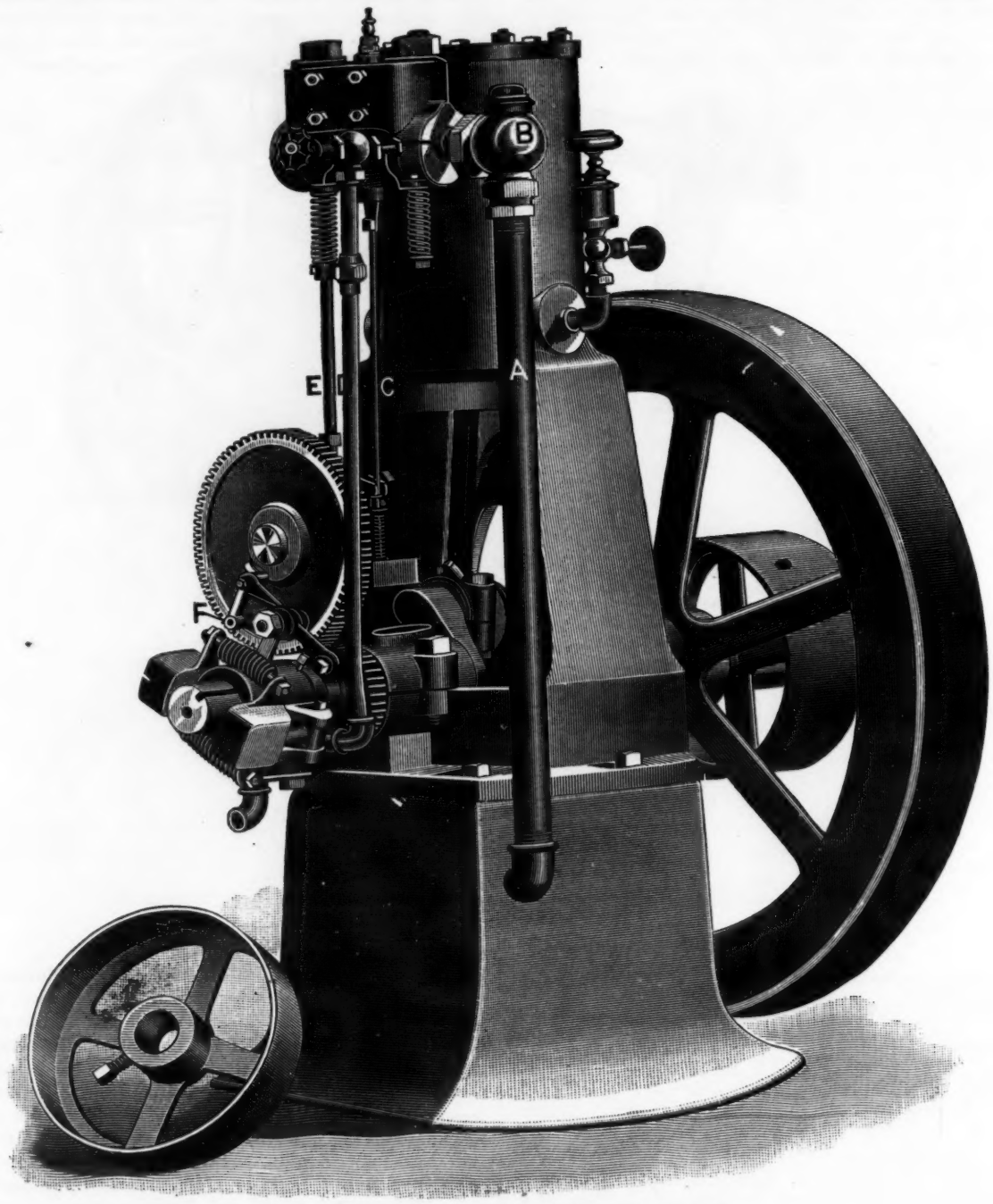


FIG. 1.—THE SINTZ GAS AND GASOLINE ENGINE.

Condition of the Connellsville Coke Trade.

The coke trade of the Connellsville region dropped off a few points last week, says the current issue of the Connellsville (Pa.) *Courier*. There was a slight increase in the number of active ovens, but production fell 6,000 tons. Shipments show a very slight decrease, about 10 cars per day. Shipments would have been larger and production greater but for a serious shortage of cars. Pennsylvania Co. and B. & O.'s were short all week. The supply of Lake Shore's, too, was short of the demand. Sixty-five Lake Erie open tops were pressed into the Chicago trade in one day. These cars are not intended to run farther than the Mahoning and Shenango valleys. Individuals are short for valley points. There are a large number of them in the trade, but they are not being unloaded promptly at the furnaces, some of which have been overstocked by too eager shippers. There was no shortage of cars the first two days of the week, but it is feared the supply of Pennsylvania Co. and B. & O's will run short again. The large number of individuals now in the region, however, precludes the possibility of any serious car famine such as embarrassed the trade a year or more ago. The detailed report of the operation and output of the region for the week ending Saturday, November 7th, shows 12,612 ovens in blast and 4,248 idle, with a total estimated production of 117,630 tons.

CINCINNATI BARBED WIRE FENCE CO.

In 1878, Joseph Darmon, H. Belmer, H. M. Burton and L. C. Bramkamp and some others formed the Cincinnati Barbed Wire Fence Co. to carry on the manufacture of barbed wire, wire nails, bale ties, bird cages of all kinds, brass and Japan wire work, wire rope, sponge and waste paper baskets, rat and mouse traps, hose nozzles, barrel covers, sieves and riddles, fly traps, Summer houses, hanging baskets, wire settees and chairs, flower stands and grave guards, poultry netting, window and door guards, desk railings, bank and counter railings, heavy spark cloth, all grades of brass and iron wire cloth, besides bristle brushes of all kinds, flue brushes for cleaning boiler flues. By close attention to business and by manufacturing none but the best quality of goods, their business has grown from year to year to its present proportions This year the company has been much encouraged in seeing an increase in their business of over 20 per cent. above previous years. They are now located, and have been for some years, at Fairmount Station, Cincinnati, where they have good facilities for carrying on their business. In this factory there are 30 wire nail machines and 40 machines for making barbed fence wire, the remaining machines are for drawing wire and for making the other articles in their line of business. The business has increased to such an extent they found it necessary to increase their facilities, and are erecting a new four-story building which will contain an engine room in which will be placed a new 1,000-horse-power automatic engine manufactured by the Bates Machine Co., of Joliet, Ill., and there will probably be added to this, new furnaces and new boilers. The portion of the building not used for engine and fuel room will be used for a warehouse and such other purposes as may be needed for their business. The company have one building 75x175 feet, 60x150, and the new building will be 200 feet square. At present they have something like 175 machines of all kinds, and as business increases may have to put in more. They now employ 200 men. Their business covers a large territory, contiguous to Cincinnati. The officers of the company are as follows: Jos. Larmen President; H. Belmer, Vice-President; H. M. Burton, Secretary, and L. C. Bramkamp, Treasurer. Mr. Belmer looks after the manufacturing part of the business, Mr. Burton and Mr. Bramkamp take charge of office matters. They are all energetic, wide-awake men.

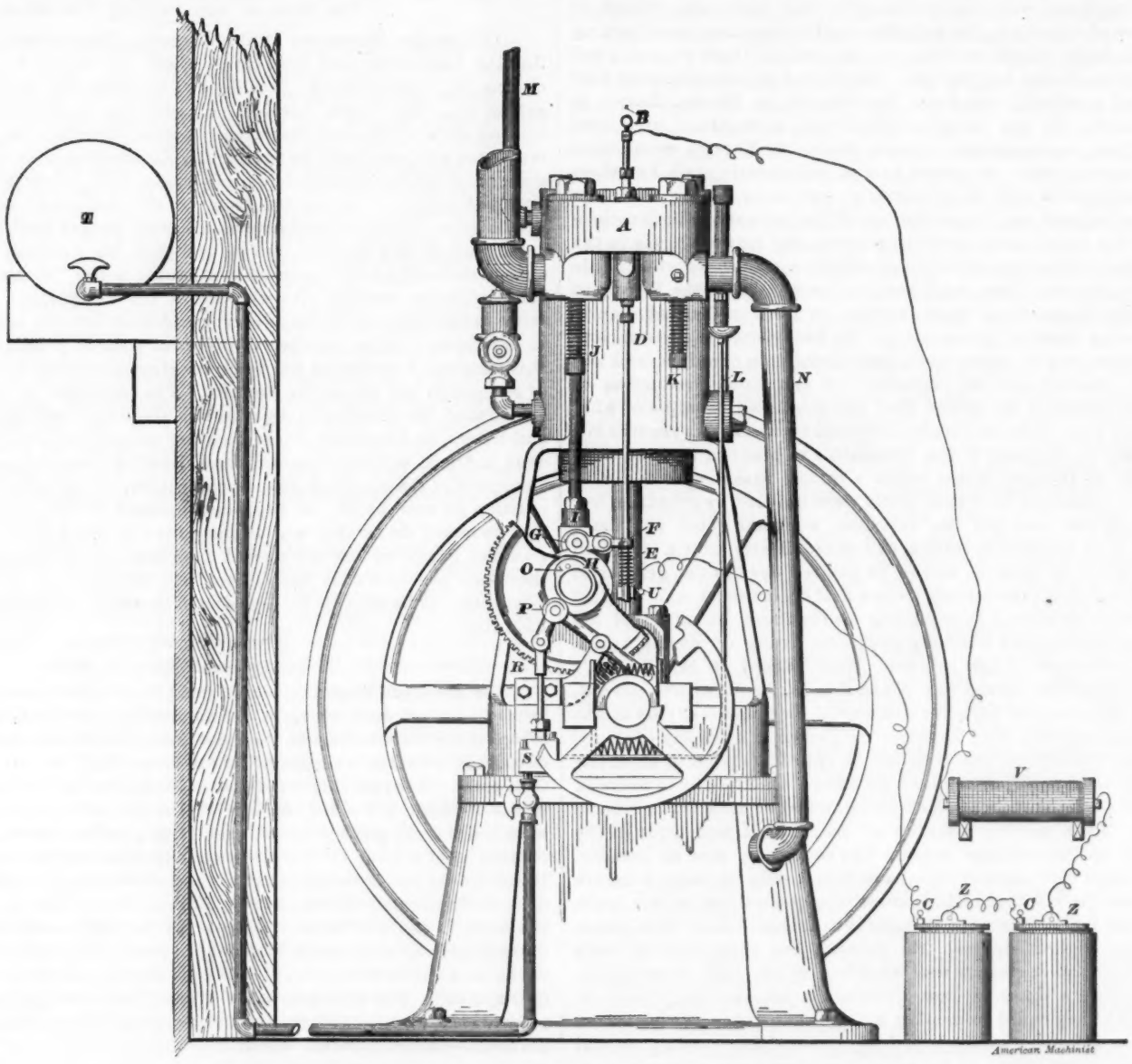


FIG. 2.—THE SINTZ GAS AND GASOLINE ENGINE—Sectional View.—(See page 6.)

The Relative Test of New and Old Metal.

The fatigue of metals under continuous strain has long been a subject of discussion. The *Electrician*, of London, in a recent report on the subject, says: "A square iron link 12 inches wide, 1 inch thick and about 12 feet long was taken from a bridge at Kieff, then about 40 years old, and tested against a similar link which had lain unused in store ever since the building of the bridge. The means of comparison was, therefore, excellent, and the result should go a long way to show whether or not iron does lose any of its strength in prolonged service. The effect of the tests was to determine for the old used link an ultimate tensile strength of 21.8 tons per square inch, an elastic limit of 11.1 tons per square inch, an elongation of 14.05 per cent., and a contraction of 17.35 per cent. at the point of fracture. For the unused link the tensile strength was found to be 22.2 tons per square inch, with an elastic limit of 11.9 tons, and elongation and contraction at fracture of 18.42 per cent. and 18.75 per cent. respectively. The two pieces of iron were, therefore, of practically identical strength; for the small difference actually observed is well within the ordinary range of variability of similar pieces of the same metal.

Reviewing an Ancient Canadian Iron Industry.

The Montreal correspondent of the *Empire* writes as follows: There are not many people in this province, and s less number outside, who are at all aware that a few weeks will witness a most vigorous revival of the iron industry on the north shore of the St. Lawrence, where the old Radnor forges, located 12 miles north of Three Rivers on the Piles branch of the Canadian Pacific, have been purchased by the Canada Iron Furnace Co., and that before the end of the year, this enterprising concern will place upon the market a quality of charcoal pig iron which. according to experts, will be superior to the best of the famous Salsbury iron of the United States. When it is known that 300 men were employed in this industry and that superior iron was manufactured and money made under the French regime, the wonder is that such immense deposits should have remained undisturbed throughout the present busy century. Enterprising men have, however, got to work at last and besides purchasing the forges above mentioned, with ore rights of over 50,000 acres, they have secured the Lac a la Turtu, which is recognized as the largest known lake deposit ore in the world. In fact, at no time in the history of the Three Rivers iron region has ore been drawn from a greater radius than seven miles, but to-day 75 miles is the radius worked by the company's employes, and they are now at work draining the lake whereby large quantities of the virginia ore will be taken. As soon as the furnaces go into blast a daily capacity of 40 tons of iron will be attained, and for the first time in the history of the country, Canada will produce a very high quality of charcoal iron that can successfully compete with the Lake Superior districts.

In discussing this matter to-day with the correspondent, a gentleman well versed in the question remarked, that when one considered that seven-eights of the cost of iron is comprised in labor, the great advantage of supporting home industries is at once visible, and when we realize that the Dominion offers an immediate market for 45,000 tons, the future of this particular enterprise seems pretty well assured. The furnaces in question will give employment to wood cutters, iron makers, brick makers and teamsters to the number of 600 men. The Canada Iron Furnace Co. is connected with the Montreal Car Wheel Co., of Lachine, and the St. Thomas Car Wheel Co., of St Thomas, Ont.

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SOME LEADING AMERICAN WORKSHOPS.

A special meeting of the Manchester Association of Engineers was held on October 31, for the purpose of discussing the paper on "Some leading American Workshops," by Mr. Hans Renold, read at the previous meeting. The president, Mr. John West, occupied the chair, and there was a good attendance. Mr. J. H. Beaston said from the remarks of Mr. Renold at the last meeting, it looked as if he was anxious they should believe as regarded emery wheels that the Americans were pre-eminent in that particular branch of industry. He knew of a works in the neighborhood where they were turning out three thousand emery wheels weekly, and the bulk of these were shipped to America. Mr. John Craven said that Mr. Renold had gone over a wide field of subjects, but had practically confined his remarks to Messrs. Brown & Sharp's establishment. He was ready to admit that as regarded high-class work and the sanitary arrangements, Messrs. Brown & Sharp's works were a model, but to mention only the above firm as representing all American establishments was unfair, and as a matter of fact many of the American workshops were not as good as a large number of the workshops in Manchester. He believed that there were a great number of gear cutters in use in the States, but he might tell Mr. Renold that the milling machine was first made in Manchester. Mr. Samuel Dixon said that he did not think Mr. Renold in his paper had meant to infer that work equally as good as he had seen in America was not being done in this country. He had visited the States, and he could say that there was no better work done there than could be, and was being done in this country, and as regarded the enormous production of milling cutters mentioned in the paper, that was simply an example of what could be done where a specialty was made of articles by firms. As regards Mr. Renold's remark that in England it was impossible to produce a round shaft from a turning tool, he thought it was rather a strong assertion to make in the present day. In America, he knew, shafts were finished by grinding, but the simple reason for that was that the American workman could not size a shaft as delicately as an English operative, and consequently after a shaft had been turned up to a certain point it had to be handed over to the grinder to be completed. He had that information from a first class turner who went to the States, and while employed at a leading works there he surprised his fellow-workmen, by turning and finishing shafts, for fitting on wheels, in the lathe without the assistance of the grinder. With regard to Mr. Renold's statement that the American thread was preferable to the Witworth thread, that in itself would form a good topic for discussion, but personally he might say he entirely disagreed with Mr. Renold. He had seen a variety of Continental and American workshops, and if he had to award the palm of superiority of workmanship he certainly should not go across the Atlantic to make it. Mr. Joseph Nasmith said that it must be admitted, whether English engineers were the inventors of the milling machine or not, that it was through the Americans taking it up that milling became the success it was at present. English engineers were very conservative, and it was only through pressure of circumstances that the milling machine came into general use in this country. When American inventions were brought into England they were generally improved to the highest degree. He thought the chief fault of both American and Continental engineers was what one might call "over-refinement." There was such a thing as over finishing a job and over-doing it. They should learn all they could from other nations, but it was unwise for an enthusiastic advocate of foreign methods to decry those of this country, as that was not the best way to progress. If American machinery was so much superior to English, how was it that cotton machinery with all its intricacies could be sent to America in face of the American manufacturers, even though the cost was increased from 40 to 60 per cent. At present it was possible for an English machinist to take a contract for the whole of the machines in an American mill inclusive of freight charges, duty, men to superintend erections, etc., at a lower cost than the American gentleman next door who had the advantage of such immeasurably superior tool.—[Iron and Coal Trades Review.

Iron Center of the Future.

"A reduction of rail rate on ore from the mines to lake ports must come" said a gentleman interested in mining affairs at Republic, Mich. "Some concession was obtained this year but it amounted to little. At the expense of being called an idiot I am going to tell you that some day the ore shipments by lake will drop off entirely. Make some figures for me. Put down the rate from the mine to the lake port, and under it handling and trimming charges add the lake rate and handling charges at lower lake ports, and finally put down the rail rate to the furnaces. Don't add interest on investment in the ore handling plants at the different ports, but tell me how much you have. It amounts to about $3 50 or $4. Railroads can carry a ton a good many miles for $4. The vicinity of Chicago will be the iron producing center of the United States before many decades. In the matter of distance from ore to coal mines, Chicago is a happy medium. Duluth and the head of Lake Superior are as much too far from the coal mines as the present furnaces are too far from the ore mines. I see a coke blast furnace has been put in at Duluth. This is the first attempt of the kind and capitalists have been slow to start it. They will be well pleased if they can turn out pig-iron as cheaply as it can be done at Pittsburgh."—[Marine Review.

The National Iron Roofing Association.

On Tuesday, November 17, the Executive Committee of the National Iron Roofing Association will meet in St. Louis, where the President of that Association, Mr. Chas. Aldrich, President of the Missouri Iron Roofing & Corrugating Co., St. Louis, resides. In addition to disposing of the regular routine work of the year that usually comes up before the Executive Committee, there will, no doubt, be interesting discussions with reference to the decision rendered by Judge Shields, of Omaha, Neb., judicially establishing the standard gauge of corrugated iron, in the absence of any definite contract. Previous to 1887 there were several different gauges used by makers of corrugated iron, in this country, and in that year the National Iron Roofing Association met and agreed upon what is known as the "Birmingham gauge," as a standard to be used by all members of the Association. This was a great relief to the manufacturers of corrugated iron, but the fact that there are still in existence a large number of different gauges is an annoyance and since that time the Association has been working vigorously to secure the adoption of one gauge for the entire country. The decision of the Nebraska court established the Birmingham gauge as a standard, understood alike by buyers and sellers, in a contract where no other gauge is expressly stipulated. President Aldrich, of the National Iron Roofing Association, is a pronounced champion of the standard gauge proposition. Soon after being elected to the position he now holds, he expressed himself frankly on that point, and said that he would do all that was in his power to bring about the adoption of a standard gauge for the corrugated iron manufacturers of the country. It is therefore probable that the subject will be taken up at the meeting of the Committee to be held in St. Louis on November 17th.—[Stoves and Hardware Reporter.

Shipping Steel Rails by Water.

The Maryland Steel Co., whose great furnace and steel rail plant is located immediately on deep water, at Baltimore, has the disadvantage of having to bring its ore from Cuba and its coke from Connellsville, but it has the great advantage of water transportation for its product to the entire Atlantic and Gulf coast. So admirably built and so complete is this plant that at present prices of about $30 a ton for steel rails, its profit on rail production are, we have heard from good sources, very large; in fact, this company is probably making steel rails at a lower cost than any other concern in the United States. It is the only rail-making plant on the seaboard, and hence it will probably, for a while at least, almost control to the extent of its capacity the market on the Atlantic and Gulf coast. During the past few weeks it has been shipping quite largely by sail vessels to Southern ports, and one schooner is now loading at its wharves with 1,600 tons of rails for Tampa, Fla., the rate being $2 00 @$2 25 a ton. The *Manufacturers' Record* has been informed that this company has been negotiating for a large supply of Bessemer ores from North Carolina.—[Manufacturers' Record.

THE hardest steel at present successfully worked by the electric welding process is that used for band saws. Besides the regular work of making the joints in continuous band saws, it had been ingeniously adopted for replacing broken teeth in finished saws. Formerly it was necessary to cut down to a smaller size any saw from which one or two teeth had been broken, thus losing not only the difference in the prices between the saws, but also the entire cost of the labor in cutting the original saw. Now when a tooth is broken out, they simply fit in a new tooth, which is electrically welded in place, and a drop of oil applied at the completion effectually restores the temper of the saw to a serviceable point.—[Invention.

AFTER an illness of about two months, resulting from heart disease and a general breaking down of his physical energies, Mr. Edward Y. Townsend, the President of the Cambria Iron Co., gently passed into his last sleep on Thursday morning, November 5, 1891, at his country residence at Bryn Mawr, near Philadelphia. He was born on October 4, 1824, and had consequently entered upon his 68th year at the time of his death.

ONE fare for round trip via Nickel Plate, November 25th and 26th, Thanksgiving.

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SUPREMACY OF HIGH-CARBON NICKEL STEEL ESTABLISHED.

We condense from the special dispatch to the New York *Tribune* the following account of the recent (second) tests of armor plate at Indian Head, near Washington, November 14: The recent (first) test, and the subsequent examination of the backs of the plates attacked on that occasion, showed the supremacy of the high carbon nickel steel untreated plate from the Bethlehem Iron Works, over a similar plate of low carbonization from the Carnegie works, and a Harveyized all-steel plate from Bethlehem. The Harveyized plate was most severe on the projectiles, while the low carbon plate presented an unlooked-for invulnerability. The weakness of the all-steel plate was attributed to the absence of the alloy which gives a toughness to the plate, rather than to the failure of the Harvey process to sustain previous records.

There were irregularities of penetration noted in the initial trial, due, it was presumed, to inequalities of treatment. The rolled plate of the first appeared to good advantage, but it was left for future results to determine the exact value of that process. Many methods of applying the Harvey process suggested themselves, the most promising being the introduction of the carbon on one side of the ingot prior to any forging, a method commendable for its economy of time and cost. The questions which were present after the five shots of the first day's trial were expected to be answered in the two remaining days' firing, and, therefore, to-day's results were waited with interest.

For purposes of comparison, the conditions of the second test were nearly identical with those of the first day. The first four shots at each plate were fired from the 6-inch breech-loading rifle, and the last or center shot, from the 8-inch gun. The velocity in the former instance was 2,075, and in the latter, 1,700, except on the final shot of the day, when a Firminy shell was used, and, being lighter in weight than Carpenter's 8-inch shell, the velocity was increased to 1,750. Brown prismatic powder from the Dupont works was used. In the 8-inch gun, Holtzer shells were used, the weight being 100 pounds, and the charge 42.4 pounds. In the 8-inch shots two rounds were fired with Carpenter 250-pound shells, requiring a powder charge of 72½ pounds, and the final round with a Firminy projectile, the manufacture of which the Carpenter people aim to duplicate. The powder charges for the Firminy projectile was 74½ pounds. The distance between gun and target was 57 feet. There were three plates, a high carbon nickel steel of 44 points, from the Carnegie works; a low carbon nickel steel, Harveyized, of 25 points, from the Carnegie works; a high carbon nickel steel, Harveyized, of 35 points, from the Bethlehem works.

At the conclusion of the fourteenth round it was seen that the Bethlehem treated plate was the best of the three; it showed least average penetration, and most nearly approached the condition of the ideal armor plate. There was a lack of uniformity which was observable in the plates of the previous day's trial, and which, as on that occasion, was due to a failure to spray all the parts of the plate with an equal temperature of water. The question seemed to be presented whether more depended on the process of spraying than on the Harvey treatment; for, despite the latter, the left-hand side of the Harveyized Bethlehem plate—that is, the part which did not get the full benefit of the shower of ice water to which the Bethlehem plates are subjected at certain periods of manufacture—was less resistant than the right-hand side. Even with this unevenness of results, it made a better showing than the low carbon treated or the high carbon untreated plates. Of the two latter, the high carbon untreated plate showed a superiority over the low carbon treated plate.

The 8 inch guns was now substituted for the 6-inch gun, and three additional rounds were fired. This closed the day's firing and left the plates in this relative position; high carbon Harveyized plate, first; high carbon untreated plate, second; low carbon Harveyized plate, third—a relationship that sustains the predictions of the Naval Bureau of Ordnance and justifies its adoption of nickel steel of high carbonization and Harvey treatment. The classification of the Carnegie high carbon plate, untreated, is due not so much to external appearance—there was really little choice in the facial results between that and the Carnegie low carbon plate—as to less penetration in the one case than in the other. The Carnegie untreated plate showed a surprising invulnerability at its center, provided the Carpenter shell was up to the standard, on which point there is some doubt. The shells were uniform throughout, the single Firminy used proving of exceptional merit, while nearly all the Holtzers were excellent. The trials at Annapolis last year and subsequently, however, demonstrated the unquestionable efficiency of both shells. The guns performed splendid service, as did the carriages.

Commodore Folger, Naval Chief of Ordnance, said after the trial: "The high carbon nickel plate from Bethlehem has shown the least penetration and the least cracking of any of the six, and is decidedly the most successful plate. The penetration is remarkably less, and the cracking one-third less, than any of the plates of the last trial. In no case did the point of the projectile get into the backing, and the plate cracked toward the weaker side. The high carbon from the Carnegie works was 45 per cent. carbon, which was new; but we feared it was too high and would probably crack. The tempering methods used in the low carbon nickel Harvey plate were exceedingly defective, and we did not expect from it better results than from the un-Harveyized nickel plate which Carnegie furnished before. The Harveyized high carbon nickel plate from Bethlehem has been our favorite, and is unquestionably superior to anything ever tried in the way of armor in this country or abroad."

Carnegie Associations Adopt Water Tube Boilers.

Commencing about ten years ago, the Carnegie interests began experimenting with water tube boilers with a view of their ultimate adoption in case they proved successful. In 1883, Mr. Julian Kennedy then being manager at Lucy furnace, they put in 832 horse-power of Babcock & Wilcox water tube boilers, at Lucy, to use blast furnace gas for fuel; one year later, in 1884, they put 416 horse-power of the same make of boilers in at their Upper Union Mills to use coal for fuel; and a year or two later they put 500 horse-power of Heine boilers in the Edgar Thomson Steel Works. In the meantime they acquired by purchase the Hartman Steel Works, at Beaver Falls, where some Babcock & Wilcox boilers had been put in 1882, and a second lot in 1883; these had been using coal for fuel since the time they were started. Natural gas coming in about this time, they did not add any power in water tube boilers until the beginning of 1891; they then contracted for 1,000 horse-power additional Babcock & Wilcox boilers for their Lucy furnaces. A little later they bought 1,200 horse-power of the Stirling water tube boilers for their Lower Union Mills. About this time, realizing that the days of natural gas, in this district, were numbered, and that to return to coal meant a great increase in boiler power at all their interests, they took up the matter of water tube boilers more thoroughly, with the result that they purchased from the Babcock & Wilcox Co., as follows:

	Horse Power.
For Upper Union Mills	750
" Duquesne Steel Works	1,000
" Homestead Steel Works	1,500
" Edgar Thomson Steel Works	2,000
Total	5,250

In the month of October, or a total of 6,250 horse-power Babcock & Wilcox boilers purchased thus far this year alone. These boilers are now all being delivered, and when they are started it will mean that the Carnegie Associations will be using over 8,000 horse-power of this one type of water tube boiler, some of them having been in use for nine years, and apparently as good to-day as when first started.

Bridges of Cast Off Railroad Iron.

A bridge of this sort (being the third of the kind) has recently been built over the Pequabuck River near Terryville, Conn., which is said to be stronger than a wooden bridge and much cheaper. With the exception of a few special castings and rods, it is built entirely of cast off railroad rails. It is a truss bridge, having a span of 19 feet, the roadway is 30 feet wide, and a sidewalk 8 feet wide on one side, the whole being covered with concrete.

The bridge rests upon stone abutments, on each of which an iron rail rests and forms "mudsills." Upon these, the stringers, which are also iron rails, are laid. Of these there are fifteen in the bridge, placed at equal distances of 2½ feet apart. Another rod, or "spindle," across the center, under and at right angles with the stringers, is supported by iron rods depending from the trusses, which also suport the bridge. Each of the trusses is formed of two rails, the ends of which are fitted into solid iron castings made of special shape to receive them, and meeting at the center of the bridge are also held together by similar castings, through which the iron rod extends, and braces extending on each side to the end of the spindle give strength as well as rigidity to the structure. Heavy plank covered with concrete forms the floor of the structure.—[World's Progress.

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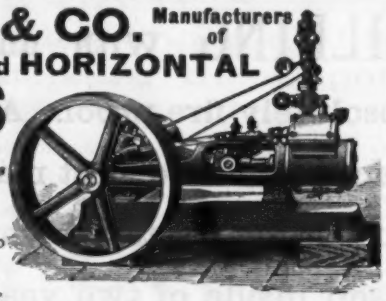

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INDUSTRIAL SUMMARY.

New Enterprises:—

The Pendulum Engine Works, of Chicago, Ill., has been organized with a capital stock of $150,000.

The Richey Manufacturing Co., at Chicago, will manufacture fuel oil gas generators; capital stock, $10,000; incorporators, F. W. Richey, W. W. Knowles and others.

The Excelsior Heater Co., of Chicago, will manufacture heaters, engines, etc.; capital stock, $150,000; incoporators, E. Littlefield, H. M. Walker and F. S. Wheaton.

The South Chicago Steel Casting Co., at Chicago, will manufacture steel castings; capital stock, $20,000; incorporators, Frederick Arnd, C. M. Walker and A. F. Evens.

The Western Tap & Die Co., at Chicago, will manufacture taps, dies, machines, specialties, etc.; capital stock, $12,000; incorporators, F. B. Furniss, L. Furniss and G. F. Worth.

The Pendulum Engine Works, at Chicago, have been established to make steam engines and boilers; capital stock, $150,000; incorporators, E. White, N. R. Barth and M. McCammon.

The Marseilles Wagon Co., at Marseilles, will manufacture wagons and farm implements; capital stock, $250,000; incorporators, Clarence Griggs, J. M. Grantham and C. L. Stinson.

The Atlas Electrical Manufacturing Co., at Chicago, propose to manufacture dynamos, motors, etc.; capital stock, $12,000; incorporators, M. F. Matteson, Q A. Stephenson and J. B. Albertson.

Chicago Electric Carriage Co., at Chicago, propose to manufacture electric carriages, motors, etc.; capital stock, $100,000; incorporators, W. O. Worth, Louis J. Pierson and Hugh McIndoe.

Last week a charter was issued to the Hostetter Coke Co., of Connellsville, Pa., with a capital stock of $5,000. The directors are Charles S. Crawford, Ernest W. Beach and Geo. B. Motheral, of Allegheny, Pa.

The Roller Bearing Cycle Co., at Chicago, have been formed to manufacture bicycles and machines of like character; capital stock, $200,000; incorporators, Alfred D. Barnes, Horatio Keeler and George F. Barrett.

The McKenzie Economic Smokeless Furnace Co., at Chicago, will manufacture devices for the saving of fuel and the suppression of smoke; capital stock $250,000; incorporators, Dougal McKenzie, G. W. Haggett and J. D. Lansing.

Application for a charter for the Allegheny County Sanitary & Manufacturing Co., of Pittsburgh, has been applied for. James Hemphill, Jos. S. Brown, George Trautman, W. A. Hoeveler and H. C. Fownes, of that city, are connected with the new enterprise.

J. S. May, Philip Engelskirger, E. E. Hughes and others have incorporated in New York the Souder Railway Freight Car Co. for the purpose of manufacturing all kinds of freight cars for railways, according to the patents of Jacob J. Souder, of Washington, D. C. The capital stock is $2,000,000.

Additions, Enlargements, Removals, etc.:—

The Milwaukee Car Wheel & Foundry Co., of Milwaukee, Wis., has decided to remove to St. Paul, Minn.

The Pennsylvania Railroad Co. have broken ground at Renova, Pa., for a passenger car shop 138x238 feet in size.

It is reported that Pike Bros., of Hogansville, Ga., have purchased and will operate the plow factory of W. S. Cox, at La Grange, Ga.

The Holyoke (Mass.) machine works, has decided to build an addition to its present works on account of the increase in its business. The new building will be of brick, 50x150 feet, and will be two stories high.

Announcement is made that negotiations have been concluded with the Derwent Foundry Co., by which that concern will erect a plant at Elwood, Pa., for the manufacture of stoves and light castings. Elwood is a new manufacturing town located about 30 miles from Pittsburgh.

General Industrial Notes:—

One of the furnaces of the Junction Iron Co., at Mingo Junction, O., made 1,675 tons of Bessemer iron in the week ending November 10.

The nail factory of the Jefferson Iron Works, Steubenville, O., has resumed operations after a shut down of two weeks for much needed repairs.

We are in receipt of a pamphlet entitled "Hot Water versus Steam Heating," which is issued by the Sanitary Publishing Co., of New York city, and which is an interesting treatise on hot water heating and the advisability of using it. It is very handsomely printed and contains illustrations of some buildings which are successfully heated by hotwater.

We are advised by the Sloss Iron & Steel Co., Birmingham Ala., that they have appointed Chamberlain, Turney & Co., agents for their iron. The high character of "Sloss" iron will be fully sustained in every particular. The Sloss Co. have always made a specialty of high grading, and used extraordinary care in the selection of ores and fuel used in their furnaces. Therefore the "Sloss" is strong, soft and clean, and for years has been universally recognized as the standard foundry and forge iron of the South.

The Riverside Iron Works are making extensive improvements about their furnace plant at Steubenville, O. They have built a very large brick pump house on the Ohio River bank and have put therein a pump that will discharge one million and a half gallons per day. They are laying a new main of 10-inch cast pipe. With these improvements they are now enabled to supply all the water they use themselves. Heretofore they depended on the city water works for a part of their supply. This company will in the near future build a new iron cast house 168 feet long.

A good demonstration that the "Eastlake" shingles contain superior merits is that they have been adopted and used on many public buildings during the past season, which they are especially adapted for, owing to the light weight, fire-proof qualities, neat appearance and durability. Messrs. W. J. Burton & Co., Detroit, Mich., the manufacturers, have just made shipment to Colfax, Wash., for school building. They have also been adopted at Kalamazoo, Mich. and used on four ward schools in preference to slate, as they will not break and drop out of place, causing leaks, by being struck with stones and other articles thrown by school children. Full information and descriptive catalogue with prices can be obtained by addressing the manufacturers.

Foreign Iron and Steel Notes.

Germany is apparently bent on making "a new departure" in regard to rail orders. The great Middlesbrough firm of Messrs Bolckow, Vaughan & Co. has secured another large "line" in steel rails for a German railway. They have succeeded in underquoting the home houses, which, as the correspondent who sends the news says, "is the more satisfactory, as it is beating our competitors in their own particular province." Early in the year, it will be remembered, the same English firm took another German contract of considerable magnitude. It would thus seem as if the "Fatherland" principle of business had been abandoned by the Kaiser's Government in favor of giving the work to the people who can do it the cheapest. It is announced that Germany is to give out next year twice as much work in steel rails as she has during the last twelve months. No doubt, under the new and more sensible commercial policy now being adopted, the British makers stand a good chance of getting a fair share of the orders. It would be interesting to know at what price the Middlesbrough firm took their latest contract, but the figure is not likely to be disclosed, as the successful competitors would naturally prefer not to show their hand too far.—[Sheffield Telegraph.

* * *

One of our English contemporaries says: "As nickel-steel armor plates are a subject of, it may be said, engrossing attention at present in naval and metallurgical circles in this country, it will, no doubt, be satisfactory for those interested to learn that the admiralty have placed throughout the kingdom orders for no fewer than 5,000 tons of the new material. This is excellent testimony to the success that has attended the experiments which have lately been in progress at the direction of our government."

* * *

Under the naval defense act of the British Parliament, passed two or three years ago, there are to be constructed for the British Navy 27 second-class cruisers and eight line-of-battle-ships. Several of these vessels have already been finished. All of the cruisers are to have a maximum speed of 20 knots.

Unwarranted Criticism of Machinery Manufacturers.

Manufacturers of machinery are very often subjected to an amount of criticism and fault-finding which is entirely unjustifiable and unwarranted. There are very few manufacturers of machinery whose productions are not all that good workmanship and good material can make them. When a piece of machinery leaves the shop it is a perfect working mechanism, and when properly set up and under the management of a competent and experienced operator, will seldom fail to give satisfaction in the work it is intented to perform. No one who has a reputation and a business to maintain would knowingly send out a piece of machinery which will not do this, and when from any cause traceable to a defect in the machine as sent out a complaint is made the manufacturer is always ready and willing to bear the loss, but he is often asked to make good a loss sustained through a cause for which he is in no way liable. In almost every instance where a complaint is made, and it is possible for the manufacturer to investigate the matter, it is found that the trouble is not in the machinery, but in its management. This is especially true where the machinery is sent out to be set up by the purchaser or some one in his employ, and so frequently is this the case, that many of the larger manufacturers of special machinery make it a part of the sale to place the machinery in position and see that it is in perfect working order.—[Manufacturers Gazette.

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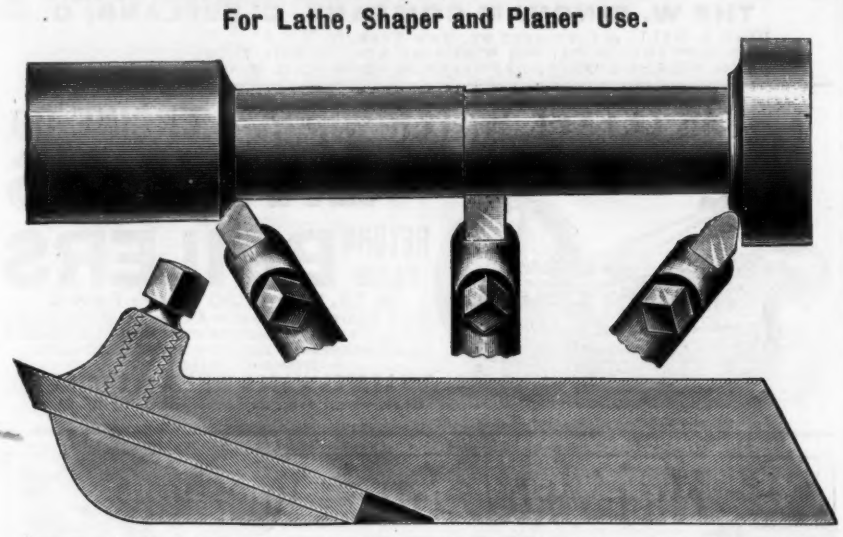

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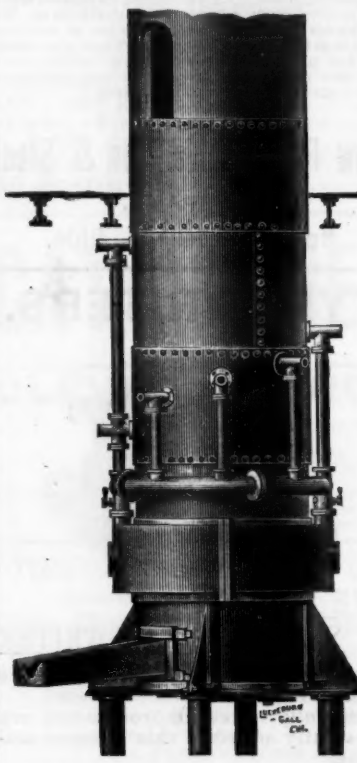

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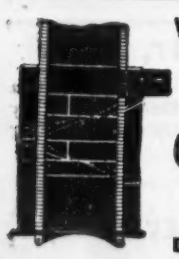

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We have five sheets mills producing one thousand tons per month and can invariably fill orders with reasonable promptness. We make all gauges from No. 10 to No. 30, and can roll to 36 in. wide. Inquiries will receive careful and prompt attention and we solicit your correspondence. Visitors are always welcome and accorded courteous treatment.

—THE—

New Philadelphia Iron & Steel

COMPANY,

New Philadelphia, Ohio.

TYPEWRITERS.

THE REMINGTON

STANDARD TYPEWRITER

Is to-day, as it has ever been, the leading Typewriter.

Carefully tested improvements are constantly added to this famous machine.

TRY OUR PARAGON BRAND OF TYPEWRITER RIBBONS.

WYCKOFF, SEAMANS AND BENEDICT,

137 Superior St., Cleveland, O.

A SPLENDID CHANCE

TO ESTABLISH YOURSELF IN A

Good Paying Business.

I have for sale a small MACHINE SHOP with good Tools, now manufacturing specialties and a good jobbing trade offered. LOW RENT. Can work into a big business. Call on or address

JAMES JENKS.

Dealer in Machinery, DETROIT, MICH.

FOR SALE.

Manufacturing Site

ON CANAL ST., CLEVELAND,

Adjoining White Sewing Machine Co.'s Plant. About 67 ft front extending back to Valley R. R. tracks. For particulars address

B. M. GARDNER,

CARE IRON TRADE REVIEW.

Advertising.

IF you wish to advertise anything anywhere at any time write to GEO. P. ROWELL & CO., No. 10 Spruce St., New York.

EVERY one in need of information on the subject of advertising will do well to obtain a copy of "Book for Advertisers," 368 pages, price one dollar. Mailed, postage paid, on receipt of price. Contains a careful compilation from the American Newspaper Directory of all the best papers and class journals; gives the circulation rating of every one, and a good deal of information about rates and other matters pertaining to the business of advertising. Address ROWELL'S ADVERTISING BUREAU, 10 Spruce St., N. Y.

PATENTS THOS. SIMPSON, Washington, D.C. No atty's fee until Patent obtained. Write for Inventor's Guide.

WHY? ARE YOU USING THAT CLUMSY OLD FASHIONED HOT IRON ROD FOR YOUR FLUE CLEANER? **WHY?**

DO YOU NOT USE THE "FIREMEN'S FRIEND" AND SECURE RELIEF.

MANUFACTURED BY

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RUGG, FULLER & CO., 212-214 FIRST ST. N. MINNEAPOLIS, MINN.

THE LEFFEL WATER WHEEL & ENGINE CO.

Build a Splendid Line of

SELF-CONTAINED SIDE-CRANK **ENGINES**

—AND—

RETURN FLUE **BOILERS**

8, 12, 16 and 20 Horse Power.

High in Grade. Low in Price. Strictly First-class. In design and construction SUPERIOR to all others. Write for ENGINE PAMPHLET.

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Greenmount Ave., SPRINGFIELD, OHIO, U.S.A.

THE NILES IRON AND STEEL ROOFING CO.

NILES, O.

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MANUFACTURERS OF

CORRUGATED, CRIMPED AND WEATHER BOARD IRON.

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THE CURTIS PAT SHEET METAL LATH.

ROLL CAP ROOFING

Strong, Well Built, Serviceable 12 TO 80 HORSE POWER.

STEAM ENGINES

ADAPTED TO HEAVY, CONTINUOUS WORK.

EVERY ENGINE TESTED UNDER FULL LOAD.

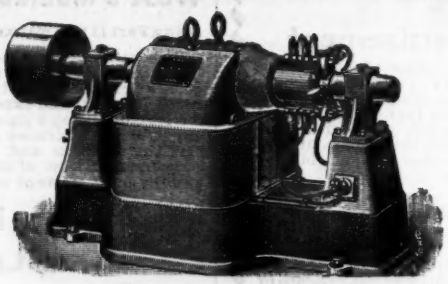
Suitable **BOILERS** on hand for immediate delivery

FOR DESCRIPTIVE CIRCULARS ADDRESS

CHANDLER & TAYLOR CO., INDIANAPOLIS, IND.

GILLETTE & LEWIS,

Electrical Contractors & Engineers



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Electric Elevators, Isolated Electric Light and Power Plants. All kinds of Electrical Engineering work, Testing, Drafting and Inspecting.

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No. 9 Rockwell St., (In rear) CLEVELAND, OHIO.

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Heavy and Light Castings.

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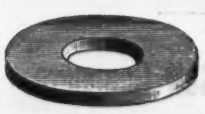

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A SPECIALTY!

Even in Gauge, smooth and well finished.

Cut from new plate, rolled expressly for the purpose. Write for prices, Address,

MILTON MFG. CO., Milton, Pa.

Elastic Rotary-Blow Riveting Machine.

JOHN ADT & SON,

NEW HAVEN, CONN.

Builders of Machinery for Hardware Manufacture.

AUTOMATIC

Wire Straightening and Cutting Machines,

BUTT MILLING MACHINERY,

Butt Drilling Machinery,

Riveting Machines,

Foot Presses,

Sprue Cutters, Etc.

PERFORATED METALS OF EVERY DESCRIPTION BY THE HARRINGTON & KING PERFORATING CO. CHICAGO.
284 Pearl St., cor. Beekman. NEW YORK.

IRON AND STEEL MARKETS.

PIG IRON.

CLEVELAND (f. o. b. cars, net cash) Bessemer, $17 30; No. 1 Foundry, $16 80; No. 2 Foundry, $15 80; No. 1 Gray Forge, red short, $14 80; No. 2 Gray Forge, neutral, $14 30; No. 1 American Scotch, $16 80; No. 2 American Scotch, $15 80.

CHICAGO (reported by Messrs. Rogers, Brown & Merwin): Southern Coke No. 1. foundry, $16 25 @17 00; Southern Coke No. 2 Foundry, $15 25 @16 00; Southern Coke No. 3 Foundry, $14 75 @15 50; Southern Coke No 1, Softeners, $15 25 @16 00; Southern Coke No. 2, Softeners, $14 50 @15 25; Ohio Silveries No. 1, $17 50@18 50; Ohio Silveries No. 2, $16 50@ 17 50; Ohio Strong Softeners No. 1, $18 00@19 00; Ohio Strong Softeners No. 2, $17 25@18 25; Lake Superior Charcoal Nos. 1 to 6, $17 75@18 50; Tennessee Charcoal No. 1, $18 00@19 00; Tennessee Charcoal No. 2, $17 00@18 00; Southern Standard Car Wheel, $21 00@23 00; Tennessee Standard Car Wheel, $00 00@00 00.

CINCINNATI (reported by Rogers, Brown & Co.): FOUNDRY IRONS—Southern Coke, No. 1 foundry, $15 00@15 50; Southern coke, No. 2 and No. 1 soft, $14 00@$14 25; Hanging Rock Coke, No. 1 foundry, $16 50@17 50; Jackson Co. Stone Coal, No. 1 foundry, $16 50@17 00; Tennessee Charcoal, No. 1 foundry, $17 00@17 50; Hanging Rock Charcoal, No. 1 foundry, $20 00 @22 00. MILL IRONS—Standard Southern Coke, grey forge, $12 75@13 00; Standard Southern Coke, mottled, $12 50@12 75; Cold Short Southern Coke, grey forge, $12 75@13 00; Strong Ohio Neutral Coke, grey forge, $15 00@15 50. CAR WHEEL AND MALLEABLE—Standard Alabama Car Wheel, $19 50@20 50; Tennessee Car Wheel, $18 00@19 00; Lake Superior Car Wheel, $19 50@20 50.

BUFFALO (reported by Rogers, Brown & Co.): Mahoning and Shenango Valley strong, No. 1 Foundry, $16 00@17 50; Mahoning and Shenango Valley strong, No. 2 Foundry, $15 00 @16 50; Ohio Softener No. 1, $16 25@16 75; Ohio softener No. 2, $15 25@15 75; Jackson Co., Silvery No. 1, $18 00@00 00; Jackson Co. Silvery, No. 2, $17 00@00 00; Lake Superior Charcoal, $18 50@00 00; Tennessee Charcoal, $18 00@19 00; Southern Softener No. 1, $16 25@00 00; Southern Softener No. 2, $15 50@15 75; Southern Strong No. 1 Foundry, $16 75@00 00; Southern Strong No. 2 Foundry, $16 25@00 00' Alabama Car Wheel, $19 75@21 75; Hanging Rock Char coal, $21 00@22 00.

LOUISVILLE (reported by Hall Bros. & Co.) HOT BLAST FOUNDRY—Southern coke No. 1, $14 25@14 50; Southern coke No. 2, $13 50@14 00; Southern coke No. 3, $13 00@13 25; Mahoning Valley (Lake ore mixtures), $00 00@00 00; Southern charcoal, No. 1, $16 00@17 00; Southern charcoal, No. 2, $15 50@16 00; Missouri charcoal, No. 1, $17 00@17 50; Missouri charcoal, No. 2, $16 50@17 00. FORGE—Neutral coke, $12 50@12 75; Cold short, $12 25@12 50; Mottled, $11 75@12 00. CAR WHEEL AND MALLEABLE—Southern (standard brands), $19 00@ 19 50; Southern (other brands), $17 00@18 00; Lake Superior, $20 00@21 00.

ST. LOUIS (reported by Rogers, Brown & Meacham): HOT BLAST COKE AND CHARCOAL—Southern Coke No. 1, $15 50@15 75; Southern Coke No. 2, $14 50@14 75; Southern Coke No. 3, $13 75@14 25; Southern Grey Forge, $13 25@ 13 50; Southern Charcoal No. 1, $17 25@17 75; Southern Charcoal No. 2, $16 75@1 25; Missouri Charcoal No. 1, $15 50@16 00; Missouri Charcoal No. 2, $15 00@15 50; Ohio Softeners, $18 00@ 19 00. CAR WHEEL AND MALLEABLE IRONS—Lake Superior, $19 50@20 00; Southern, $19 50@ 20 00. CONNELLSVILLE COKE—East St. Louis, $0 00; St. Louis, $5 65.

DETROIT (reported by William F. Jarvis & Co.): Lake Superior Charcoal, all Numbers, $18 00@18 50; Lake Superior (coke) Bessemer, $16 50@17 00; Katahdin (Maine charcoal), $00 00 @00 00; Lake Superior Coke, Foundry, all ore, $17 50@18 00; Lake Superior Coke, Foundry, all ore, $00 00@00 00; Standard Ohio Black Band, $18 00@18 50; Southern No. 1 $16 25@16 50; Southern Gray Forge, $14 00@ 14 50; Jackson County (Ohio) Silvery, $18 25@ 18 75; Old Car Wheel, $00 00@00 00. Connellsville Coke, $0.00.

LOUISVILLE (reported by Geo. H. Hull & Co.): Southern Coke No. 1 Foundry $14 00@ 15 00; Southern Coke No. 2 Foundry $13 75@ 14 25; Southern Coke No. 3 Foundry $13 25@ 13 75; Grey Forge, $12 50@12 75; Southern Coke Silver Grey, $00 00@00 00; Southern Charcoal No. 1 Foundry, $16 00@17 00; Car Wheel, $18 00@20 00.

PITTSBURGH (reported by A. H. Childs): No. 1 Foundry, $15 50@16 00; No. 2 Foundry, $14 50@15 00; Grey Forge, $13 50@13 75; White and Mottled, $13 00@13 25; Warm Blast Charcoal, $18 00@22 00; Cold Blast Charcoal, $22 00 @26 00; Bessemer, $15 00@15 25.

MERCHANT IRON AND STEEL.

Flat Bar

1½ to 4 by ⅜ to 1 inch	1 70
4½ to 6 by ⅜ to 1 inch	1 55
1¾ to 6 by 1¼ to 2 inch	2 15
1¾ & 1¾ by ⅜ to ½ inch	1 85
1 & 1¼ by ⅜ to ½ inch	1 95
⅝, ¾ and ⅞ by ⅜ to ½ inch	2 15

Round and Square.

1 to 1⅝ inch	1 75
2 to 2¼ inch	1 95
2¼ to 3¼ inch	2 25
3¼ to 4 inch	2 75
4¼ to 4½ inch	3 25
4½ to 5 inch	3 45

Oval.

½ to 1¼ inch	2 15
⅝ to ¾ inch	2 25
⅞	2 55
⅞	2 95

Half Oval and Half Round.

⅜ to 1 inch	2 85
⅝ to 1¼ inch	2 45
⅝ to ¾ inch	3 05
⅞	3 25
⅞	4 75

Heavy Band.

⅛ to 6 by ¼ and 5-16 inch	1 55
⅜ to 1¼ by ¼ and 5-16 inch	2 05
⅛ to ⅞ by ¼ and 5-16 inch	2 25
to ⅞ by ¼ and 5-16 inch	3 75

Hoops.

1¼ to 4, Nos. 13 to 15	2 55
1¼ to 2, Nos. 16 to 18	2 65
1¼ to 2, No. 19	2 75
1¼ to 2, No. 20	2 85
1¼ to 2, No. 21	2 95
1¼ to 2, No. 22	3 05
15-16, 1 and 1¼, Nos. 13 to 15	2 75
15-16, 1 and 1¼, Nos. 16 to 18	2 85
15-16, 1 and 1¼, Nos. 19 and 20	2 95
15-16, 1 and 1¼, No. 21	3 05
15-16, 1 and 1¼, No. 22	3 15
⅞, Nos. 13 to 15	2 95
⅞, Nos. 16 to 18	3 05
⅞, Nos. 19 and 20	3 15
⅞, No. 21	3 25
⅞, No. 22	3 35
13-16, Nos. 13 to 15	3 15
13-16, Nos. 16 to 18	3 25
13-16, Nos. 19 and 20	3 35
13-16, No. 21	3 45
13-16, No. 22	3 55
¾, Nos. 13 to 15	3 25
¾, Nos. 16 to 18	3 45
¾, Nos. 19 and 20	3 55
¾, No. 21	3 65
¾, No. 22	3 75
11-16, Nos. 13 to 15	3 55
11-16, Nos. 16 to 18	3 65
11-16, Nos. 19 and 20	3 75
11-16, No. 21	3 85
11-16, No. 22	3 95
⅞, Nos. 13 to 15	3 75
⅞, Nos. 16 to 18	3 95
⅞, Nos. 19 and 20	4 05
⅞, No. 21	4 15
⅞, No. 22	4 25
⅞, No. 23	4 45

Light Band.

1⅜ to 6 by ⅛ to 3-16 in	2 20
1⅜ to 6 by Nos. 11 and 12	2 30
1 to 1⅜ by ⅛ to 3-16 in	2 40
1 to 1⅜ by Nos. 11 and 12	2 50
⅛ and 13-16 by ⅛ to 3-16 in	2 70
⅛ and 1 3-16 by Nos. 11 and 12	2 80
¼ and 11-16 by ⅛ to 3-16 in	3 00
¼ and 11-16 by Nos. 11 and 12	3 10
⅛ and 9-16 by ⅛ to 3-16 in	3 30
⅛ and 9-16 by Nos. 11 and 12	3 40
⅛ by ⅜ to 3-16 in	3 60
⅛ by Nos. 11 and 12	3 70

Wagon Box Iron.

⅛ inch, beveled edge, by Nos. 11 and 12	2 80
⅛ inch, " " " 13 and 14	3 00
¼ inch, " " " 11 and 12	3 10
¼ inch, " " " 13 and 14	3 30

Sheet Iron.

No. 10 to 14	2 45
No. 15 to 17	2 55
No. 18 to 21	2 75
No. 22 to 24	2 85
No. 25 to 26	2 95
No. 27	3 25
No. 28	3 50

Iron Boiler Plates.

Tank, ¼ inch and heavier	2 25
C No. 1, " "	2 40
C H No. 1 " "	2 50
C H Flange, " "	3 10
Extra Flange, "	4 00
Solid Fire Box "	4 75

Steel Boiler Plates—1-4 in. and Heavier.

Tank	2 25
Shell	2 10
Flange	2 75
Marine Flange	3 00
Fire Box	4 00

Above includes plates 90 inches wide.

90 to 96 in. wide	¼c lb extra
96 to 100 in. wide	1 c "
100 to 104 in. wide	1¼c "
104 to 116 in. wide	special

American Cast Tool Steel.

ROUND, SQUARE AND OCTAGON.	cts. lbs
1 to 2 in. inclusive	08
9-16 to ⅞ in "	08½
7-16 to ⅝ and 2⅜ to 3 in	09
3⅛ to 4 in	09½
⅝ to 11-16 and 4⅜	10
⅝ to 6 in	10½
¼ to 9-32 and 6⅜ to 7 in	11
3-6 in	13

Flats.

	cts. lbs
2 to 9-16 wide by 2 to ⅝ thick	8

Bessemer and O. H. Steel.

Machinery	base price,	2 35
Tire	"	2 25
Spring	"	2 80
Sleigh Shoe	"	2 50
Toe Calk	"	2 35
Cutter Shoes, tapered and butt.	"	2 75

English Tool Steel.

Jessop's	15½
Hobson's "Best"	15½
" "Choice"	15

Burden Boiler Rivets.

⅜, ½, 11-16 and ⅝ inches diameter	4 00
Bridge ⅜, ½, 11-16 and ⅝ inch diam	4 00

SCRAP IRON AND OLD METAL.

NET TONS	
No. 1 R. R. wrought scrap	$18 00
No. 1 wrought scrap	16 50
No. 1 Machine cast scrap	11 50
Iron axles	23 50
Axle turnings	13 50
Wrought turning (free from cast)	11 50
Cast borings	8 00
Uncut wrought iron boilers	11 50
Steel boiler plates	16 00
Grate Bars	8 00
Pipes and flues (Clean)	12 00
Tank iron	12 50
Hoop and band iron	9 50
Sheet iron	8 50
Wrought drillings	11 00
Malleable iron	9 50

Reported by Messrs. BLACK & POLLOCK, Cincinnati, O.:

Railroad Wrought	$20 00
No. 1 Country Wrought	17 00
Stove Plate	8 75
Machine Castings	11 00
Hoop and Sheet	8 00
Casting Borings	9 00
Wrought Turnings	12 00

AKRON HEATING AND VENTILATING CO.;
—MANUFACTURERS OF—
HOT BLAST HEATING APPARATUS for heating and ventilating buildings and drying lumber, brick and tile.
BLOWERS for forges and cupolas.
EXHAUST FANS for handling shavings, dust and air.
VENTILATING FANS for ventilating halls, dinning rooms, stores, woolen mills, malt houses, etc., etc.
CLEVELAND OFFICE:
36 South Water St., C. E. McCOMBS, Manager.

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CLEVELAND ROLLING MILL CO.,
MANUFACTURERS OF
BESSEMER STEEL RAILS,
Blooms and Billets, Steel Angles, Forgings, Bar and Spring Steel. Steel Street Rails, Steel Oil Barrel Hoops, Wire of all Kinds, Iron and Steel Boiler Plates, Galvanized and Black Sheet Iron, Corrugated Iron Roofing, Sheet Steel.

PITTSBURGH & WHEELING COAL CO.,
MINERS AND SHIPPERS OF
Ohio Steam Coal and Coke.
Mines on the Cleveland, Lorain & Wheeling R. R. Capacity, 3,000 tons daily.
Office, 6 Mercantile Bank Building, CLEVELAND, OHIO.
Lake Shipping Point, Lorain O
JAS. PATTERSON, Sales Agent.

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DEALERS IN
Iron Ore & Pig Iron,
Rooms 716, 717, 718, 719 Perry-Payne Bld'g, CLEVELAND, O.

OGLEBAY, NORTON & CO.,
Successors to Tuttle, Oglebay & Co.,
Commission Dealers in
Iron - Ores,
FROM MARQUETTE, GOGEBIC AND MENOMINEE DISTRICTS,
CLEVELAND, OHIO.

J. H. OUTHWAITE. W. G. POLLOCK.
J. H. OUTHWAITE & CO.,
Exclusive attention given to
LAKE SUPERIOR AND MENOMINEE RANGE
Iron Ore,
Perry-Payne B'ld'g. Cleveland, O.

THE CONDIT-FULLER CO.,
Pig and Bar Iron,
CLEVELAND, OHIO.

E. C. POPE,
COMMISSION DEALER IN
Iron Ore, Pig Iron
AND METALS.
Cleveland, - Ohio.

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Cleveland Iron Mining Co.,
Dealers in Iron Ores
from their own mines near Marquette, Lake Superior.
Rooms 4 & 5 Mercantile Bank Building, CLEVELAND O.

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A great saving in mortar, material and labor Write for Catalogue and Sample.
THE BOSTWICK STEEL LATH CO.,
38 Park Row, New York City. Niles, O
Mention this Paper.

ESTABLISHED 1854.
PETER GERLACH & CO.,
MAKERS OF
Saws, Tools and Machinery.
Office and Warerooms, 28 Columbus st. Factories on Columbus, Winter and Leeds streets.
Cleveland, O., U. S. A.

DESKS.

BANK, RAILROAD
—AND—
OFFICE + FURNITURE.
Interior Work a Specialty.
Send for Illustrated Catalogue.
THE CLEVELAND DESK CO.
97-99 Ontario St.. • • Cleveland, Ohio.

MACHINERY SUPPLY MARKET.

Anvils.

American.....₩ lb 9@10
Wrights.....₩ lb 12

Bellows.

Blacksmiths' { Hill's.....dis 40 / Bullock's.....dis 50&10
Moulders'.....dis 40@40&10
Hand.....dis 40&10@50

Belting.

Boston Belting Co's standard.....dis 70
" " " extra.....dis 60&5
" " " best.....dis 55
Hoyt's Short Lap.....dis 45
Cleveland Rubber Co. extra standard..dis 60&10
Shults Raw Hide Leather Belting, single, ...dis 40
Shults Raw Hide Leather Belting, double, and Light Double.....dis 40
Standard, oak tanned.....dis 50&10
Alexander Brothers' pure oak tanned. ...dis 45

Blowers and Exhausters.

B. F. Sturtevant's.....dis 20
Boston Blower Co.....dis 35
Buffalo.....dis 35

Borax.

.....₩ lb 12

Chalk.

White.....₩ gross 50
White Crayon.....₩ gross 12@12½ dis 10
Red.....dis 70
Blue.....dis 85

Chucks.

Cushman's 4 Jaw Independent.....dis 45
" Combination.....dis 40
" Geared Scroll.....dis 30
" 2 Jaw Brass Workers.....dis 30
" Drill.....dis 35
Wescott's Scroll Combination.....dis 33⅓
" Independent.....dis 40
" Little Giant Drill.....dis 30
Horton's Universal.....dis 40
" Independent.....dis 45
Whiton's Independent.....dis 45
National Combination.....dis 40
Sweetland " .....dis 40
Almond Drill.....dis 20
Morse " .....dis 15
Skinner's Combination Lathe.....dis 33⅓
" Independent Lathe.....dis 40
" Universal Lathe.....dis 40
" Drill.....dis 15

Cutters and Reamers.

Cleveland.....dis 10@15
Pratt & Whitney.....dis 10@15
Standard.....dis 10@15
Brown & Sharpe, Milling Cutters.....dis 15
" Gear Cutters.....dis 15

Crowbars.

Cast Steel.....₩ lb 4
Iron, steel points.....₩ lb 3½

Drill and Drill Sockets.

Twist drills.....dis 50&10
Morse Taper and Straight shank to 1⅜".....dis 50&10
Morse Taper and Straight shank Larger than 1⅜".....dis 25
Drill Sockets.....dis 25
Standard Twist Drills.....dis 55@55&5
Cleveland " " .....dis 55@55&5

Emery.

	No. 4 to 46 gr.	No. 54 to 150. gr.	Flour, F.	C. F. FF.
Kegs, ₩ lb	4 c	5 c		2½c
½ kegs ₩ lb	4½c	5½c		2¾c
¼ kegs ₩ lb	4¾c	5¾c		3 c
6 lb cans, 10 in case	6 c	6½c		5 c
6 lb cans, less than 1	10 c	10 c		7½c

Emery Cloth and Paper.

Barder, Adamson & Co.....dis 45@50
H. H. Barton.....dis 50@50&10

Emery Wheels.

Detroit.....dis 55@60
Norton's.....dis 55@60
Grant.....dis 55@60
Sterling.....dis 60
Celluloid.....dis 10&33⅓
Northampton.....dis 55
Crystal.....dis 65@70
Vitrified.....dis 60
Vulcanite.....dis 10&10

Files.

Nicholson.....dis 60&10@60&10&10
" X. F.....dis 25
Kearney & Foot.....dis 60&10@60&10&10
Black Diamond.....dis 60&10@60&10&10
Arcade.....dis 60&10@60&10&10
Disston's.....dis 65@70
Western.....dis 70
Stub's.....dis 25
Grobet's.....dis 30
Reynolds Bros.' Hand Cut.....dis 50
ndustry File Works, hand cut.....dis 50

Hammers.

P. S. W.....dis 40
Atha new list, Jan. 15, 1887.....dis 50
Heavy hammers and sledges under 5 lbs. 18c over 5 lbs 14c, new list.

Jack Screws.

Illinois Bolt Co. list.....dis 70

Nuts and Washers.

Size of bolt inches	⅜	5-16	⅜	½	⅝	¾	1
Square	8	7	5½	4½	4	3½	2½
Hexagon	13½	11½	8½	6	5½	5½	5
Washers	9	8	7	5	4½	4½	4½

In lots less than 100 lbs, ₩ lb add ½c., 1lb boxes add 1c to list.

Nails (wire.

List July 14, 1887.....dis 70 &10
Standard Penny Nails, ₩ keg card rate
{ Car lots.....$2.30
{ Less than car lots $2.40

Oilers.

Zinc and Tin.....dis 60
Brass and Copper.....dis 50
Malleable (Hammer's), No. 1, $5.60; No. 2, $4.00; No. 3, $4.40 ₩ doz.....dis 10@10&10

Packing, Steam.

Boston Belting Co.....dis 60
American Packing Hemp.....₩ lb 10@11
Russia Packing " .....₩ lb 14
Italian Packing " .....₩ lb 12@14
Plumbago Piston.....₩ lb 40
Morrison's " .....₩ lb 50
Square Flax " .....₩ lb 50
Sheet Rubber.....₩ lb 12&24
Excelsior Rubber.....₩ lb 40

Picks.

Railroads, 5 to 6 lbs.....$12 dis 60
" 6 to 7 lbs.....$13 dis 60

Pulleys.

Iron Pulleys, Walker List.....dis 45
Medart Pulleys.....dis 55
Split Wood Pulleys.....dis 50@55

Rivets.

Iron, Thousand, list November 17, ...dis 50
Iron, Ordinary, Cooper's Block and Carriage list November 17.....dis 50
Copper.....dis 50@50&10

Rope.

Manilla, ½ inch and over.....₩ lb 13¾
Sisal, ½ inch and over .....₩ lb 12¾

Sand Paper.

B. A. & Co.....dis 45@50
H. H. Barton's.....dis 40@45
New England Flint.....dis 40@50
Barton's Garnet.....dis 20

Saws.

Disston's Circular.....dis 40@10
" Band.....dis 20
" Scroll.....Net
Hack Saw Stubs.....dis 20
" " Eureka.....dis 20
" " Star.....dis 20
Saw Swages Disston's.....dis 30
Atkins' Cicular Saws.....dis 40&45
" Mill, Mulay and Drag Saws..dis 40&10
" Wood Saws.....dis 40&10
" Silver Steel Diamond Cross-cut Saws.....dis 70c per ft
" Dexter Cross-cuts.....dis 50c "
" Diamond " .....dis 30c "
" Tuttle Tooth Cross-cuts..dis 25c "
" One-man Cross-cuts.....dis 32c "
No. 1 Handles.....dis 25c per pair
No. 6 " .....dis 16c "
Excelsior Saw Tools.....$6 per doz
Perfection " .....$15 "
Detroit Saw Works, Circular.....dis 50
" " " Band.....dis 25
" " " Mulay.....dis 45

Screws.

Wood Screws—New List 1890.

Flat head iron.....dis 72½
Round head iron.....dis 67½
Flat head brass.....dis 72½
Round head brass.....dis 65
Square Cap.....dis 65
Hexagon Cap.....dis 60
Set C. H. C. P.....dis 70
Machine, flat head, iron.....dis 65
Machine, round head, iron.....dis 60
Bench and hand—
Lag or coach.....dis 75@75&10
Coach, patent gimlet point.....dis 75

Shovels and Spades.

Ames' list November 1, 1885.....dis 20
Dennis.....dis 5.25
Hussey & Binns, railroad.....dis 8.00

Taps.

Cards, Hand and Nut to 2 in.....dis 50
Carpenters' " " " .....dis 50
Morse " " " .....dis 50
Pratt & Whitney " " new list dis 10
Machine Screw Taps.....dis 55
Pipe Taps to 2½ in.....dis 70
Stay Bolt Taps.....dis 25
Stove Bolt Taps.....dis 50
Pulley Taps.....dis 40

Twine.

	BC.	B.
No. 12, Flax Twine, ¼ and ½ lb Balls	21c@29c	
No. 18 " " ¼ and ½ "	18c@28c	
No. 36 " " ¼ and ½ "	16c@27c	
2-Ply Hemp, ¼ & ½ lb Balls (Spring Twine	11½c	
3-Ply " 1 lb Balls	12@12½c	
3-Ply " 1½ lb Balls	11@11½c	
Cotton Wrapping, 5 Balls to lb	15@16c	

Vises.

Solid Box.....dis 60
Parker's.....dis 20@25
Prentiss.....dis 20
Stephen's.....dis 25@30
Barrett's.....dis 30
Miller's Falls.....dis 40
Merrill's.....dis 15@20
Howard.....dis 25

Wire.

New List, Jan. 18, 1884

Brass and copper.....dis 20@25
Bright and annealed, Nos. 0@18...dis 70&10@75
" " Nos. 19@26..dis 75@75& 5
" " Nos. 27@36..dis 75&10& 5
Coppered Nos. 0 to 18, market list..dis 70@70& 5
Galvanized Nos. 0 to 18 " "..dis 65&5
Tinned market Nos. 0 to 18.....dis 67½
Cast steel.....dis 50
Tinned Broom Wire.....dis 70&5@70&10
Annealed Fence, Nos. 8 and 9.....dis 75
Annealed Grape, Nos. 12 to 14.....dis 75
Stub's Steel Wir , regular.....$6.00@lb dis 5

Wrenches.

Coe's genuine, ...dis 50
Girard Standard.....dis 70&10
Agricultural.....dis 75&10
Mechanics'.....dis 55&10,& 5
Bemis & Call's Combination .....dis 35
Donohue's Engineers.....dis 20&10
Lamson & Sessions Engineers.....dis 60
Billings & Spencer's Drop Forged.....dis 25
William's " " .....dis 25
Alligator " " .....dis 50

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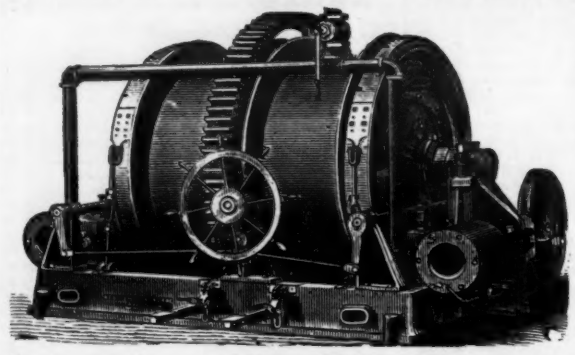

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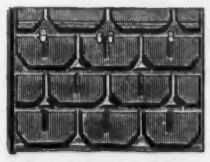

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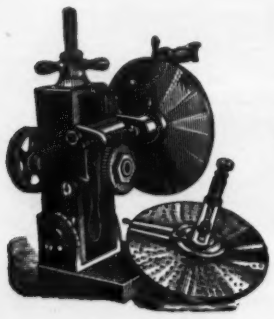

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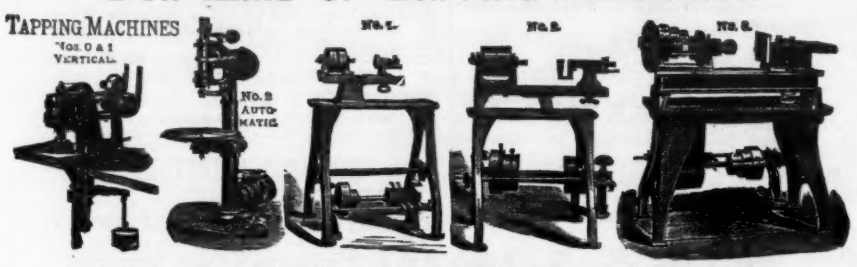

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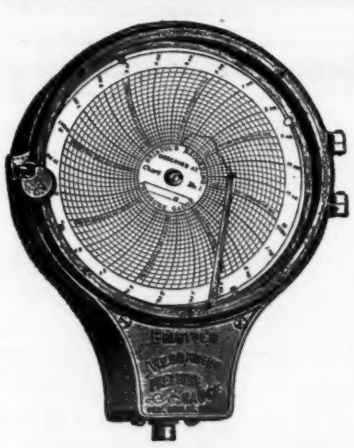

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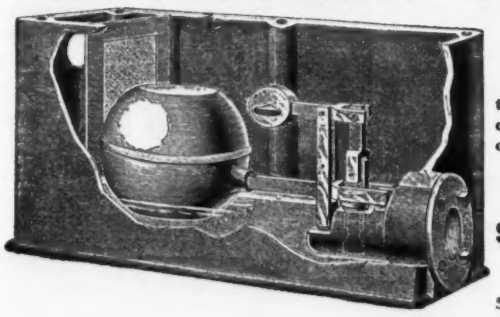

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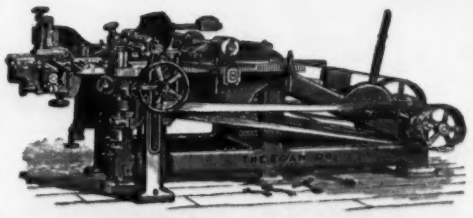

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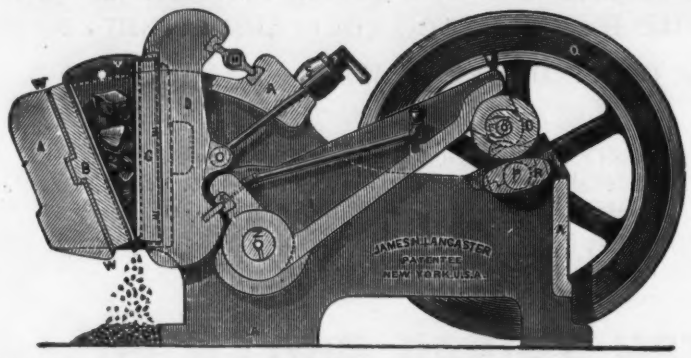

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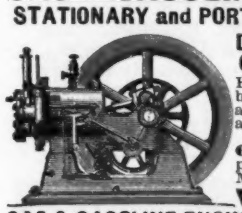

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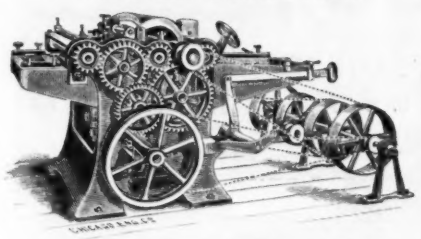

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Standard Time.

Erie Railway.

Depot, South Water Street and Viaduct.

	Arrive.	Depart.
N. Y. & Pitts. Express.....	‡5 58 a m	*8 25 a m
Fast N. Y. & Pitts. Express*	10 55 a m	*3 00 p m
Mahoning Accommo.....		†6 40 a m
Pittsburgh Express.....	†6 25 p m	
Youngstown Local.....	†8 05 a m	
Mahon'g div. & Pitts Local		*11 40 a m
Mahoning Val. Accom.....		†4 30 p m
Pittsburgh Express.....	†1 20 p m	11 10 p m
New York Express.....	*8 00 p m	.....

*Daily. †Daily, except Sunday. ‡Daily except Monday.

Cleveland & Canton Railroad.

(Standard Gauge.)

Depart for—

Zanesville and Coshocton—6:50 a. m., 3:00 p. m.
Canton—6:50 a. m., 3:00 p. m., 6:20 p. m.
Kent—6:50 a. m., 3:00 p. m., *5:45 p. m. 6:20 p. m.
Bedford—6:50 a. m., 11:10 a. m., 1:30 p. m., 3:00 p. m., 4:40 p. m., *5:45 p. m., 6:20 p. m. 10:35 p. m.
Newburgh—6:15 a. m., 6:50 a. m., 11:10 a. m., 1.30 p. m., 3:00 p. m., 4:40 p. m., *5:45 p. m., 6:20 p. m., 10:35 p. m.

Arrive from—

Zanesville and Coshocton—10:30 a. m.,6:30 p m.
Canton, 10:30 a. m., 2:35 p. m., 6:30 p. m.
Kent—*8:10 a. m., 10:30 a. m., 2:35 p. m., 6:30 p.m.
Bedford—6:00 a. m., *8:10 a.m., 10:30 a.m., 1:05 p. m., 2:35 p. m., 4:15 p. m., 6:30 p.m., 7:10 p.m.
Newburgh—6:00 a. m., 7:15 a. m., *8:10 a. m., 10:30 a. m., 1.05 p. m., 2:35 p. m., 4:15 p. m., 6:30 p. m., 7:10 p. m.

Trains marked * run daily.

Valley Railway.

FOR AKRON, CANTON AND MARIETTA.

Depot oot South Water Street.

	Depart.	Arrive.
Valley Junction Mail.....	*7 25 a m	*6 40 p m
Chicago Express	*8 35 a m	*10 00 p m
Marietta Express.....	†11 15 a m	†2 35 p m
Balto. & Wash. Express....	*4 00 p m	*10 25 a m
Cleve. and Canton Express	†6 30 p m	†8 20 a m

*Daily. †Daily, except Sunday.

I. T. JOHNSON, Gen. Supt. J. B. CAVEN, Gen. Pass. Agt.

From Cleveland Union Station.

PENNSYLVANIA LINES.

Cleveland & Pittsburgh R. R.

	Arrive.	Depart.
For Pittsburgh, Baltimore, Washington, Philadelphia and New York.	d5 25 a m	7 45 a m
	d11 40 a m	d1 40 p m
	6 35 p m	d11 10 p m
Wellsville, Wheeling and Bellaire.	12 30 p m	7 45 a m
	6 35 p m	1 05 p m
	.....	*11 10 p m
Alliance Accom.....	10 10 a m	3 25 p m
Ravenna Accom.....	8 25 a m	5 00 p m

d Daily. * Except Saturday. Other trains except Sunday. Through Pullman Sleepers to New York on 1:40 p. m. train daily.

From Cleveland Union Station.

Mt Vernon and Pan Handle Route

Cleveland & Pittsburgh R. R.

	Arrive.	Depart.
For Cuyahoga Falls, Akron, Orrville, Millersburg, Gambier, Mt. Vernon, Columbus, Xenia, Dayton, Cincinnati, Louisville, Indianapolis, St. Louis, and all points in the South and Southwest	d 7 00 a m	d 8 00 a m
	d 5 40 p m	d 8 00 p m
For Cuyahoga Falls, Akron, Orrville, Millersburg, Gambier, Mt. Vernon and Columbus.	12 30 p m	1 05 p m
For Cuyahoga Falls, Akron, Orrville, Chicago, and all points in the West and Northwest.	d 5 40 p m	d 8 00 a m
	10 10 a m	3 25 p m

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	Depart.
No. 62, Accommodation.....	† 6 10 a m
No. 72, New York & Pitts. Express....	* 8 15 a m
No. 70, Pittsburgh Accom.....	*11 25 a m
No. 64, New York & Pitts. Limited...	* 3 00 p m
No. 66, Mantua Accommo.....	* 4 20 p m
No. 74, Youngst'n Ex.....	† 6 00 p m
No. 68, New York & Pitts. Ex.....	*11 00 p m
	Arrive.
No. 61, N. Y. & Pittsburgh Express...	† 5 15 a m
No. 71, Youngstown Accom.....	* 7 00 a m
No. 65, New York & Pitts. Lim.....	* 9 55 a m
No. 67, Pittsburgh Accom.....	*12 10 p m
No. 73, Leavittsburgh Local.....	* 2 10 p m
No. 63, New York & Pitts. Ex.....	* 6 50 p m
No, 75, Mantua Accom.....	* 7 20 p m
No. 69, Youngstown Express.....	† 9 10 p m

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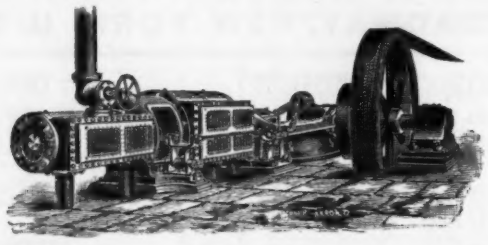

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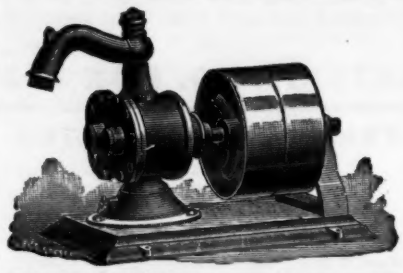

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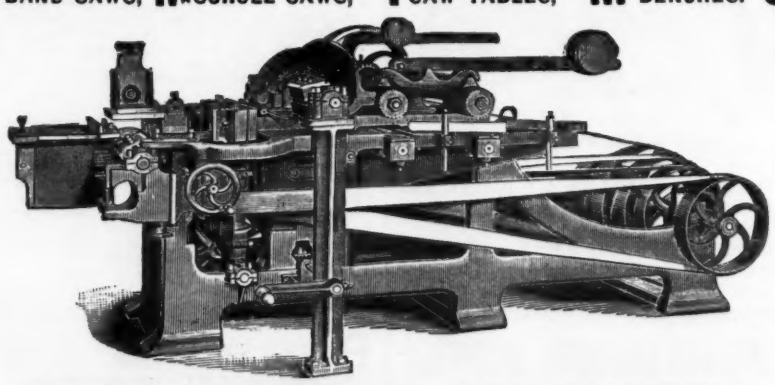

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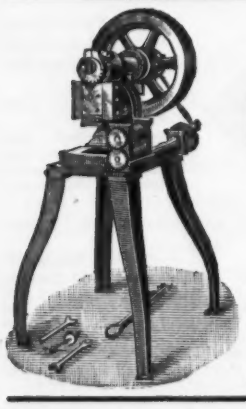

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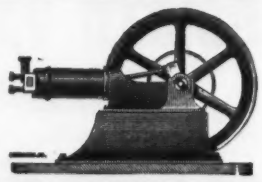

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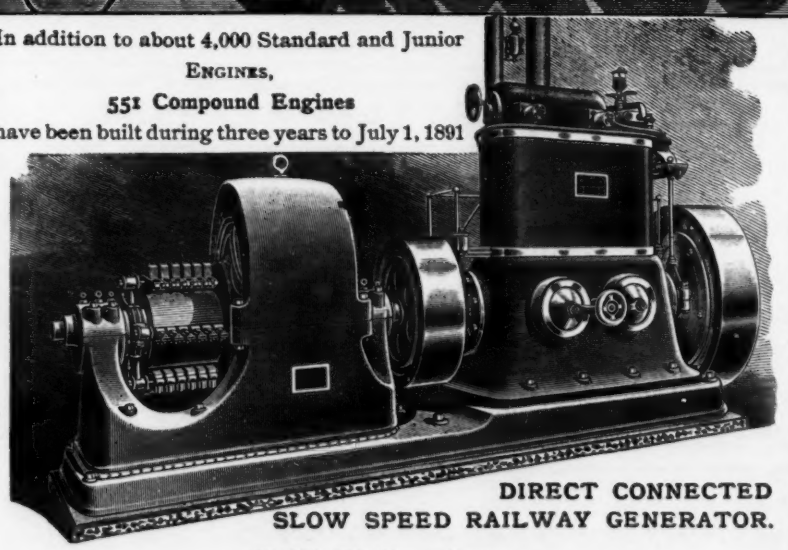

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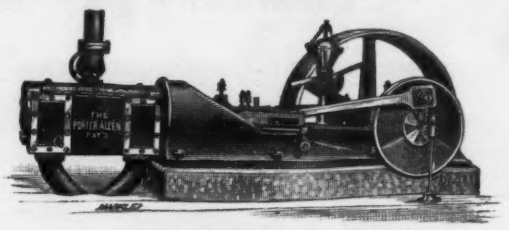

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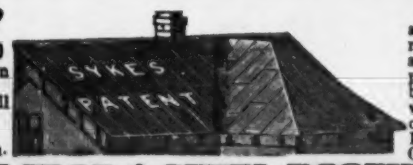

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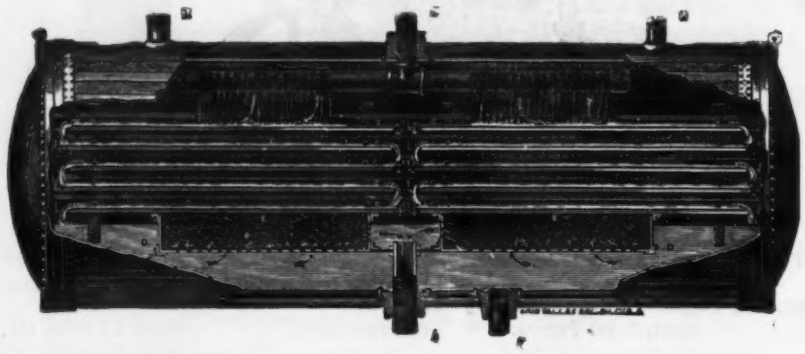

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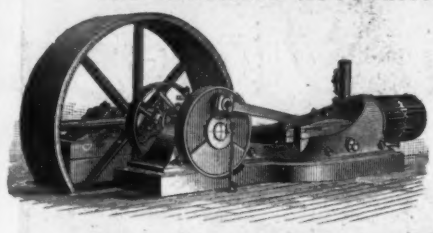

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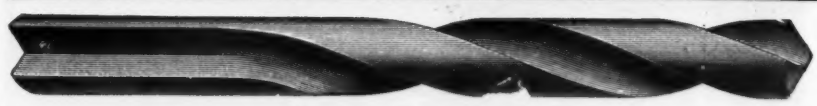

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